

The Association of Special Libraries and Information Bureaux

Report of Proceedings

of the

TENTH CONFERENCE

held at

Wills Hall, Bristol

SEPTEMBER 22nd to 25th, 1933

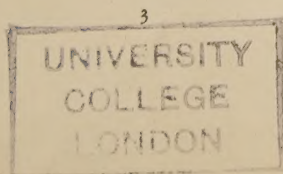
THE OBJECTS OF THE ASSOCIATION ARE: To examine, foster, and co-ordinate the activities of special libraries, information bureaux, and similar services; to act as a clearing-house for these services; to develop the usefulness and efficiency of special libraries and information bureaux under whatever titles they may function; and generally to promote, whether by conferences, meetings, or other means, the wider dissemination and the systematic use of published information.

The Association aims at assisting members who desire information of any kind to get into touch with the appropriate library or other body specialising on the subject; it does not itself attempt to build up any centralised organisation to provide the detailed information direct.

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The Association of Special Libraries and Information Bureaux.

16, RUSSELL SQUARE, LONDON, W.C.1.

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- 2 MISS HELEN B. ARMSTRONG, M.A. American Library Association.
- 3 MAJOR G. B. ATHOE, F.R.S.A., F.I.A.A., F.I.A.S., M.Inst.R.A. Incorporated Association of Architects and Surveyors.
- 4 STANLEY H. BADOCK, LL.D., J.P. University of Bristol.
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- 6 WILFRID BONSER, PH.D., B.A. Birmingham University Library.
- 7 S. C. BRADFORD, D.Sc. The Science Library.
- 8 MRS. S. C. BRADFORD
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- 10 R. BRIGHTMAN, M.Sc.(Lond.), F.I.C. I.C.I. (Dyestuffs Group), Ltd.
- 11 MRS. R. BRIGHTMAN
- 12 J. W. H. BROWN National Union of Teachers.
- 13 MISS P. G. BYLES, B.Litt. Luxor Expedition of the Oriental Institute.
- 14 G. T. CLARKSON Royal Aircraft Establishment.
- 15 MISS J. N. COMBE, F.L.A. Imperial Bureau of Soil Science.
- 16 W. L. COOPER, M.A. University of Bristol.
- 17 MISS GERTRUDE COWLIN College of Nursing.
- 18 C. S. COX, F.L.A. City of Leicester Municipal Library.
- 19 J. SHUM COX University of Bristol.
- 20 FRANK W. CREWS, B.A. Institute of Transport.
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- 24 A. E. DILLON Manchester Commercial Library, and Manchester Public Libraries.
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- 26 S. P. DOBBS Cadbury Brothers, Ltd.
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- 36 MISS E. M. FORCEY Transport and General Workers' Union.
- 37 W. LUDFORD FREEMAN, M.A., LL.D. University of Bristol.
- 38 B. FULLMAN British Non-Ferrous Metals Research Association.
- 39 PROFESSOR W. E. GARNER, D.Sc. University of Bristol and the Faraday Society.
- 40 S. W. GIBSON British Thomson-Houston Company, Ltd.
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- 60 H. V. HORTON, B.Sc., A.I.C. Royal Photographic Society.
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- 62 MRS. R. S. HUTTON.
- 63 A. B. HYSLOP Carnegie United Kingdom Trust.
- 64 G. P. INSH, M.A., D.Litt. Educational Institute of Scotland.
- 65* MISS R. W. JAMES Agricultural Economics Research Institute.
- 66 HERBERT H. JOHNSON, M.I.Mech.E., M.I.E.E. "Engineering."
- 67 MRS. HERBERT H. JOHNSON.
- 68 O. D. KENDALL, M.A. University of Bristol.
- 69 MISS D. KNIGHT National Institute for Research in Dairying.
- 70 MISS V. C. LAWE Ministry of Agriculture and Fisheries.
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- 72 H. I. M. LEWER W. T. Henley's Telegraph Works Company, Ltd.
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- 75 A. W. LING, M.Sc., N.D.A. University of Bristol.
- 76 THOMAS LOVEDAY, M.A., LL.D. University of Bristol.
- 77 JOHN MCADAM, F.L.A. Warrington Municipal Library.
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- 81 R. H. NEW Clarendon Press, Oxford.
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- 90 NORMAN PARLEY Research and Development Department, The Mond Nickel Company, Ltd.
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- 93 PROFESSOR J. C. PHILIP, F.R.S. British Cast Iron Research Association.
- 94 R. G. PITTARD Imperial College of Science and Technology, and Society of Chemical Industry.
- 95 Dr. D. M. PULLEN Bristol Tramways and Carriage Company, Ltd.
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104 COUNCILLOR DR. ALEXANDER SANDISON, O.B.E., B.Sc. Croydon Public Libraries.
105 MISS G. E. SEARIGHT Times Book Club, Bristol.
106 MAJOR E. L. SELLARS, M.C., I.C.I. (Alkali), Ltd.
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107 COLONEL THE MASTER OF SEMPELL.
108 MISS WINIFRED SHAPLAND University of Bristol.
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111*ERIC N. SIMONS Edgar Allen and Company, Ltd.
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D.Sc.
113 W. H. SMITH, B.COM. Lennards, Ltd.
114 G. T. SPINKS, M.A. Long Ashton Research Station.
115 MISS V. ELIZABETH STOCKTON National Federation of Iron and Steel Manufacturers.
116 MISS PHILIPPA STRACHEY London and National Society for Women's Service.
117 J. C. STOPANI STUART, Sir W. G. Armstrong Whitworth and Company
M.I.A.E., M.I.L.E., M.I.E.S. (Engineers), Ltd.
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119 MISS L. G. THOMERSON, B.Sc. Research Association of British Flour Millers.
120 A. E. TOOKE, B.Sc., A.R.C.S., British Electrical and Allied Industries
D.I.C. Research Association.
121 COUNCILLOR F. W. TOOKEY Leicester Museum and Library Committee.
122 ERNEST WALLS, M.A.
123 MISS K. E. WATKINS, B.Sc. Northern Polytechnic.
124 T. THORNTON WILLS W. D. and H. O. Wills.
125 MISS C. E. ELLINGTON Gas Light and Coke Company.
WRIGHT, M.B.E.
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127 MISS GLADYS R. ALLEN. Woolwich Research Department.
128 A. B. BLAKE, B.Sc., A.M.I.Mech.E.
129 C. V. DAWE, M.Com. University of Bristol.
130 MISS L. B. DIBBEN. Ministry of Labour.
131 MRS. DORA GRIFFITHS, M.Com., A.C.I.I.
132 JAMES HORSFALL.
133 J. C. HOSKEN. British Commercial Gas Association.
134 J. H. PAFFORD, M.A., F.L.A. National Central Library.
135 W. A. POOL. Imperial Bureau of Animal Health.

*. Prevented from attending.

Editorial Note.

THE papers that follow constitute a record of the proceedings of the Tenth Conference of the Association. Written papers were, as a rule, prepared in advance by the speakers, and these have been reprinted in full. No verbatim reports of the discussions were made, but, with the aid of notes taken by the Stewards of the meetings and provided by the various contributors to the discussions, as full a report has been printed as the limitations of space permit. It should be noted that where contributions have been summarised because of this limitation any reader interested may see the full report at the ASLIB office. The editors take this opportunity to acknowledge their indebtedness to all those members of the Conference who have sent in notes of their contributions.

An index to the contents of the Report is printed at the end. Copies of the Reports of the nine previous Conferences are still available, and the fifth Report contains an index to the first five.

These Reports are indexed in the Industrial Arts Index of The H. W. Wilson Company, of New York.

16, RUSSELL SQUARE,
LONDON, W.C.1.

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MR. B. FULLMAN, B.Sc., A.I.C. (British Non-Ferrous
Metals Research Association); MISS E. W. PARKER
(Research and Development Department, Mond Nickel
Co., Ltd.); MR. N. PARLEY (Percy Lund Humphries
and Co., Ltd.); MISS N. PEARCE, A.I.A. (British Cast
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Notgemeinschaft der Deutschen Wissenschaft.

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Reception and Opening Session.

Delegates were received before dinner by SIR CHARLES SHERRINGTON, the President of the Association, and by the Council.

After dinner the chair was taken by DR. THOMAS LOVEDAY, Vice-Chancellor of the University of Bristol, who welcomed the delegates to the city.

SIR CHARLES SHERRINGTON delivered a short address in which he thanked the Vice-Chancellor for his welcome. He said that it was the first time for many years that the ASLIB Conference had wandered from Oxford or Cambridge. Bristol University buildings were an example of that extraordinary development of university education which had been begun some twenty-five years before, and he hoped that the history of that movement would be written while those concerned in it were still alive.

In his introductory remarks, Sir Charles referred to the regrettable absence of Sir Frederic Nathan, and to the great loss the Association had sustained through the resignation of the Secretary, Mr. S. S. Bullock. Best wishes were expressed for their speedy and complete recovery to health.

Sir Charles then went on to speak of medical libraries and the need for co-ordination amongst them. These had frequently developed from departmental libraries, each eager to get as many books as possible for its own research workers. What was now wanted was co-operation between special libraries to prevent overlapping and to ensure that, out of the increasing flood of scientific periodical literature, the greater number of papers would be available in one place or another. London has some of the best medical libraries in the world, but a central bureau is needed which would both indicate to the research student where certain books may be consulted and would give to the Press authoritative statements on medical matters.

The President's speech was followed by an impromptu address by PROFESSOR R. S. HUTTON, Chairman of the Association. Professor Hutton had only just returned from the United States of America and had much of interest to say about what he had observed during his visit. He had been impressed by the desire for information on the part of business men in America and had found that a closer touch was maintained between the commercial firms and the libraries than was the case in this country. The present financial depression was having a serious effect upon the output of those American institutions which were in receipt of a government grant, since the expenditure was at the mercy of Congressmen, who did not appreciate the ultimate value of research. Amongst other things, Professor Hutton mentioned the fine work that was being done by the British Library of Information in New York, where British Government publications can be consulted and bought. This had been founded during the war and the experiment had proved to be a definite success.

The Year's Work of ASLIB.

As far back as 1929 Bristol was suggested as a meeting-place for ASLIB's Conference. At that time lack of suitable accommodation made it impossible, and the next three meetings were held at Oxford. The question, however, was raised again last year, and as Wills Hall had become available it was decided to break with tradition and to hold the 1933 meeting at Bristol. It is hoped that by shifting the centre of ASLIB's activities, for one meeting at any rate, we may be able to break new ground and to interest firms and individuals who, up to now, have not been in direct contact with the Association.

With much regret the Council of the Association received Mr. Bullock's resignation of his position as Secretary of ASLIB. Since the illness which prevented his attendance at the Conference last year Mr. Bullock has not been in good health, and he has been advised that prolonged and complete rest is essential. In these circumstances the Council had no alternative but to accept the resignation, and members will share their earnest hope that Mr. Bullock's restoration to health will be rapid and complete.

Miss E. M. R. Ditmas, M.A. (Oxon.), was appointed to succeed Mr. Bullock and began her duties on June 7th.

THE ASSOCIATION'S COUNCIL AND COMMITTEES.

The first meeting of the new Council, elected at the last Annual General Meeting, was held on November 15th, 1932, when Professor R. S. Hutton was re-elected Chairman and Colonel Sir Frederic Nathan Vice-chairman. During the year seven meetings of the Council were held. In February, Dr. A. P. Thurston resigned his membership of the Council owing to pressure of business, and in May the Association was further unfortunate in losing the valuable help of the Honorary Secretary, Miss A. L. Lawrence, who has retired from the British Medical Association to become Principal of the Durham Diocesan Training College. The Council sustained still further losses in June through the resignation of Mrs. J. E. Hodgson (formerly Miss Norma Lewis), who had given up her work with the League of Nations Union, and through the death of Mr. J. C. Stobart.

The Council appointed a Committee consisting of Dr. S. C. Bradford, Mr. J. J. Eaton, Mr. B. M. Headicar, Mr. J. E. Hodgson, Miss B. M. Dent, and the Honorary Officers to make arrangements for the 1933 Conference. Later Mr. F. A. Hoare, Mr. J. G. Pearce, and Mr. A. F. Ridley were co-opted, and this Committee has held a number of meetings.

In addition to the Conference Committee and other committees which are mentioned in their place later in the report, there have been many meetings of a sub-committee consisting of the Honorary Officers, at which much of the Association's business has been carried out or prepared for consideration by the Council.

FINANCE AND MEMBERSHIP.

The audited Annual Accounts of the Association have been circulated for consideration at the Annual General Meeting, and only a brief reference to them is necessary here.

The generous response of members to the special appeal issued last financial year enabled the Association to maintain its activities and to realise a carry-over to this year (1933-34) of £54. As the average excess of expenditure over income for the last three years (1930-31 to 1932-33) has been £130, it would appear that we shall not balance our budget this year. The position would therefore be serious if it were not for the fact that the appointment of a new General Secretary consequent on the regrettable retirement of Mr. Bullock has resulted in a considerable saving on salary. The margin is, however, small and will not allow of any increase in the present activities of ASLIB. A sound financial position, that would allow of the expansion of the work of the Association in more than one desirable direction, can only be achieved by a material increase in membership. On the first of January, 1932, we had 334 members; now we have only 298, a net loss of 36, notwithstanding the fact that 31 new members have joined during that period. The Council is arranging for an intensive new membership campaign, and it appeals once more to individual members to use their best endeavours to obtain new members.

THE ASLIB ENQUIRY BUREAU.

The enquiries dealt with at ASLIB's office continue to be many and various, although, from the fact that they tend to come from a small circle of members, it appears that the facilities offered by this side of ASLIB's organisation are not quite as well known as they might be. The information asked for covers an immense range, a natural outcome of ASLIB's diverse membership. We welcome this, as it is just this spanning of the gulf between widely-separated subjects which is one of the chief aims of the Association.

Enquiries are not by any means confined to books. Within recent months ASLIB has dealt with such diverse matters as the statistics of the world output of copper sulphate, eel farming, the present constitution of the club founded by Doctor Samuel Johnson, etc.

PANEL OF EXPERT TRANSLATORS.

On behalf of our Panel of Expert Translators we would make a renewed appeal to ASLIB members to spread the knowledge of this service amongst any who are likely to make use of it. ASLIB has no funds for an advertising campaign and must depend upon its members to broadcast the fact that we have upon our Panel experts in foreign languages who are also qualified in many technical subjects. Members may, perhaps, forgive us for reminding them that we have those on our Panel who are qualified to translate many of the less common languages, such as Malay, Pali, Persian, and Sanskrit, as well as those who are expert in modern European languages. A number of those enrolled are also willing to act as interpreters should the occasion arise.

ASLIB DIRECTORY.

The sales of the Directory during the year were seven copies, four by the Oxford University Press and three by the Association itself.

Alterations and additions continue to be recorded, and certain of these are being printed in the September issue of the Bulletin. The Directory is in constant use by the office staff and it is noticeable that, in spite of its publication five years ago, it is still invaluable as a book of reference.

"ASLIB INFORMATION."

The quarterly issue of the Bulletin continues, and there is increasing evidence of its usefulness to members. Requests from certain libraries for back numbers for filing prove that its worth is not considered to be merely ephemeral. In this connection would members please note that Bulletin Number Five is now out of print.

ASLIB AND CLASSIFICATION.

As a result of somewhat prolonged and complicated negotiations with Mr. Dewey, an agreement was reached in regard to the publication of an English Edition of the Universal Decimal Classification on certain conditions with which it was agreed there would be no difficulty in complying. After a careful study of the various methods of production the Joint Committee has finally decided that it should be printed. The great bulk of the French Edition has been translated and brought up to date, and the Joint Committee is now negotiating for printing and publishing.

ADVANCE INDEX TO SCIENTIFIC PAPERS.

A preliminary letter was sent by the Joint Committee to certain selected scientific and technical organisations; the responses were not encouraging. It was then decided to obtain the views unofficially of the Royal Society and of the Federation of British Industries. Here again the opinion was expressed that it was doubtful whether there was likely to be any demand for such a publication, and the Joint Committee has decided not to proceed further at present.

INDEX TO UNPUBLISHED DOCUMENTS.

The Committee appointed to deal with the proposed Index to Unpublished Documents was elected at the first meeting of the new Council held on November 15th, 1932, and consisted of the following: Miss M. E. Cleeve, Mr. B. M. Headicar, Mr. A. F. Ridley, Mr. H. L. Robinson, Mr. C. A. Spencer, and the Honorary Officers.

The replies received from those ASLIB members who had been invited to take part in the formation of the index were rather disappointing. Of the sixty selected institutions to whom the circular had been sent, thirty-five did not reply at all, twelve stated that they were unwilling to do what was asked or that they possessed no material of the kind to be included in the proposed index. Only thirteen gave replies of a positive character, but in spite of this somewhat meagre response, results were such that the Committee decided that the project was worth pursuing. In view of the response from certain

of the universities which had been approached, the Committee decided to make the index at first one of the unpublished theses by members of British universities.

With the kind co-operation of Mr. Brander, of the Universities Bureau of the British Empire, the Secretary was enabled to lay the suggestion personally before the Committee of Vice-Chancellors and Principals, and their approval has been secured. The circularisation of the universities will therefore have to be the next step in the formation of the index.

THE BUSINESS MAN'S DIRECTORY.

Owing to the illness of Mr. Bullock, no further progress has been made with the production of the Business Man's Directory.

ABSTRACTS.

At the first meeting of the new Council, the Abstracts Committee was appointed as follows: Mr. A. A. Eldridge, Mr. Freeman Horn, Mr. W. A. Pool, Mr. C. A. Spencer, and the Honorary Officers. Several meetings of the Committee were held and work was started along one or two lines of enquiry that had been suggested after Mr. Eldridge's paper at the last Conference. Information has been collected as to some of the chief Abstracts publications and it is hoped that a mimeographed report may be issued later in the year. Some work has also been done on the question of methods of transliterating names in non-Latin Scripts. Unfortunately work on both these subjects of enquiry has been delayed by the illness of the Secretary.

REPORT OF THE MANCHESTER BRANCH OF ASLIB.

Miss B. M. Dent, Secretary of the Manchester Branch of ASLIB, sends the following report:

Three meetings have been held during the year. At the first, which was a meeting for members and their friends, held on September 13th, 1932, Mr. R. Brightman, Librarian of the Imperial Chemical Industries (Dyestuffs Group), gave an account of his library, showing how experience has led him to insist on certain principles of organisation and describing the technique necessary to carry them out. An interesting discussion followed. Mr. Brightman's paper was published in "ASLIB Information" for December last.

The second meeting, held on January 31st, 1933, was open to the public, and was an attempt to make ASLIB better known in the neighbourhood and increase the membership. Mr. J. G. Pearce, Director of the British Cast Iron Research Association, and one of the founders of ASLIB, very kindly consented to come to Manchester and address the meeting. His subject was "The User of Information and the Value of ASLIB to Information Users." This very stimulating address was much appreciated by both members and non-members, and the able chairmanship of Mr. A. P. M. Fleming, Director of the Metropolitan-Vickers Electrical Company, added considerably to the success of the meeting. A few paragraphs taken from Mr. Pearce's notes appeared in "ASLIB Information" for March, 1933.

The third meeting was again a private meeting for members and friends. Two members of the branch, Mr. G. Darling, of the Publicity

Department (Information Bureau), Co-operative Wholesale Society, and Mr. F. Newby, Technical Librarian of the Carborundum Company, gave half-hour papers on the function of their information bureaux in relation to the work of their organisations as a whole. Mr. Darling's paper appeared in the June, 1933, issue of "ASLIB Information." It was clear that members much enjoyed hearing details of these methods and were glad of the opportunity allowed for discussion.

The number of branch members remains the same as last year.

In consultation with ASLIB, Mr. Nowell, Manchester's Chief Librarian, arranged in May a meeting of special librarians and representatives of other firms interested to discuss the question of storage of periodicals at the new Central Library, the formation of duplicate sets of periodicals for loan, and allied questions.

A SHEFFIELD SCHEME.

We are pleased to be able to report a direct result of the 1932 Conference. In consequence of the paper read then by Mr. J. P. Lamb, "The Public Library as an Aid to Industry and Research," a meeting of Sheffield manufacturers was convened by the Public Libraries Committee. ASLIB was represented by Professor R. S. Hutton and a meeting was attended by representatives of about twenty of the chief firms and technical institutions in Sheffield. A scheme for co-ordinating the technical information of the city through the preparation of a Union List and a system of inter-loan facilities was discussed and generally approved, and a small sub-committee was appointed. This sub-committee of five has held two meetings and the scheme is now working.

The Council wishes to express its great satisfaction in securing Sir Charles Sherrington's consent to continue as President for the forthcoming year and their gratitude for his interest in the Association's work.

In the absence of Professor R. S. Hutton abroad, this report has been compiled with the help of Sir Frederic Nathan.

F. L. NATHAN,
Vice-Chairman.

E. M. R. DITMAS,
General Secretary.

Organising a Research Bureau.

By J. C. STOPANI STUART, M.I.A.E., M.I.L.E., M.I.E.S.

FOREWORD.

In presenting this paper in its present form the writer realises that he has included in it a considerable amount of detail information. He has, however, done this deliberately, with the object of making it really helpful to those contemplating the formation of a bureau. Experience has shown that the conception of the broad idea is simple, but it is in organising each step that pitfalls for the unwary have been discovered, hence the details.

INTRODUCTION.

For the purpose of this paper the definition of the word " research " may be taken as meaning general scientific service by advice, supplying of accurate data, and the provision of scientific intelligence and literature. The organisation to be described is that of Sir W. G. Armstrong Whitworth and Co. (Engineers), Ltd., Scotswood Works, Newcastle-upon-Tyne. It supplies information on diverse subjects to the following subsidiary companies and departments :

Companies.

Departments.

Spencer-Hopwood (Boiler) Co. .	Diesel Traction Department.
Isothermos (Axle-box) Co. . .	Locomotive Department.
Cravens (Machine Tool) Co. .	Marine Department.
Armstrong Saurer (Lorry) Co. .	Pneumatic Tool Department.
Walker Shipyard	Furnace and Die Casting Departments.
Close Works Foundry	General Engineering Department.

A considerable proportion of the information is supplied through the medium of weekly abstracts from the technical press. They contain general, patent, and catalogue sections, which will be dealt with fully later.

The need for such an information service was foreseen by the writer some five years ago and the preliminary organisation undertaken by him in odd moments. As the services rendered became known considerable use was made of them, until they grew to such an extent that a suitably-equipped office was found to be necessary. The present layout of it is shown in Figure 1.

It is interesting (to the writer at least) to record that not one piece of special furniture was purchased. It was collected in parts from offices and departments where it could be spared. The initial cost was therefore negligible. The arrangement of the office, with the fittings available, was, however, very carefully planned to produce maximum efficiency at a minimum of cost.

FUNCTIONS OF THE BUREAU.

As now organised, the principal functions are as follows :

- (1) Reviewing weekly, circulating, abstracting, and filing about fifty periodicals.
- (2) Card indexing articles abstracted.
- (3) Distributing abstracts.
- (4) Obtaining and circulating catalogues.
- (5) Registering catalogues.
- (6) Obtaining and circulating advance copies of papers read to technical institutions.
- (7) Distributing monthly circulars giving details of technical meetings.
- (8) Posting in works and offices notices of technical meetings.
- (9) Examining weekly all patent abridgements and perusing the *Patents Journal*.
- (10) Distributing weekly patent abridgements and specially-ordered patent specifications.
- (11) Reviewing where possible, ordering when necessary, and issuing new publications.
- (12) Obtaining upon request information on any subject likely to be of use to members of the staff.
- (13) Cataloguing all publications purchased by the company.
- (14) Generally acting in an advisory capacity on questions relating to technical, practical, and patent problems.

Stating the functions of the Bureau before dealing with its organisation may, to some readers, appear to be like putting the cart before the horse. There is, however, a reason for so doing. When the writer set himself the task of forming an information service he had mentally decided upon its functions before considering how the problems involved would be approached. It was, therefore, in deciding upon the *modus operandi* and prosecuting it that the need of careful organisation and close attention to detail manifested themselves.

PRELIMINARY ORGANISATION.

The first steps taken towards organisation were as follows :

- (A) Tabulating a list of all periodicals purchased by the company, or received free through their Publicity Department.
- (B) Tabulating a list of all text-books and bound volumes in the possession of departmental managers but owned by the company.
- (C) Compiling a list of institutions, etc., to which the company subscribed.
- (D) Establishing friendly relations with local libraries.
- (E) Establishing friendly relations with all the leading technical societies in Britain.

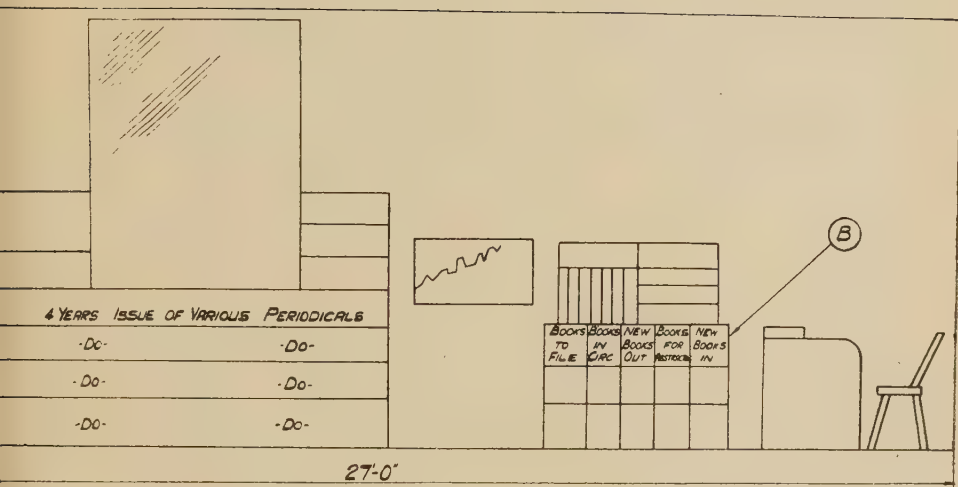


FIGURE 1A.

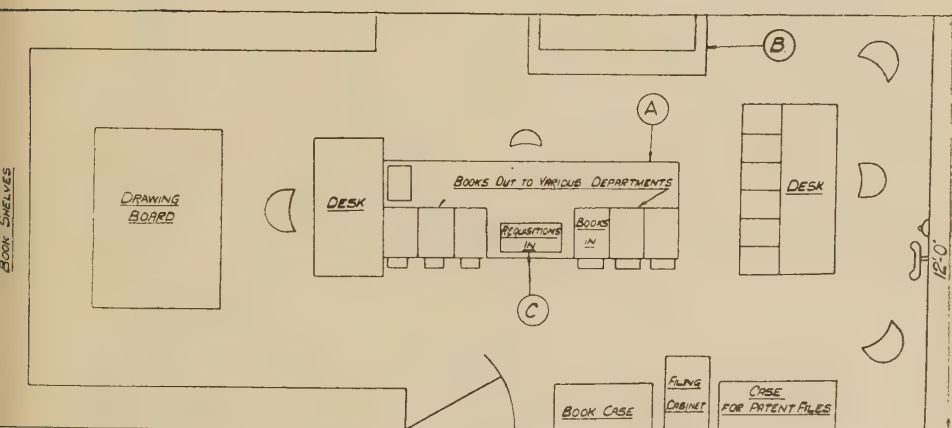
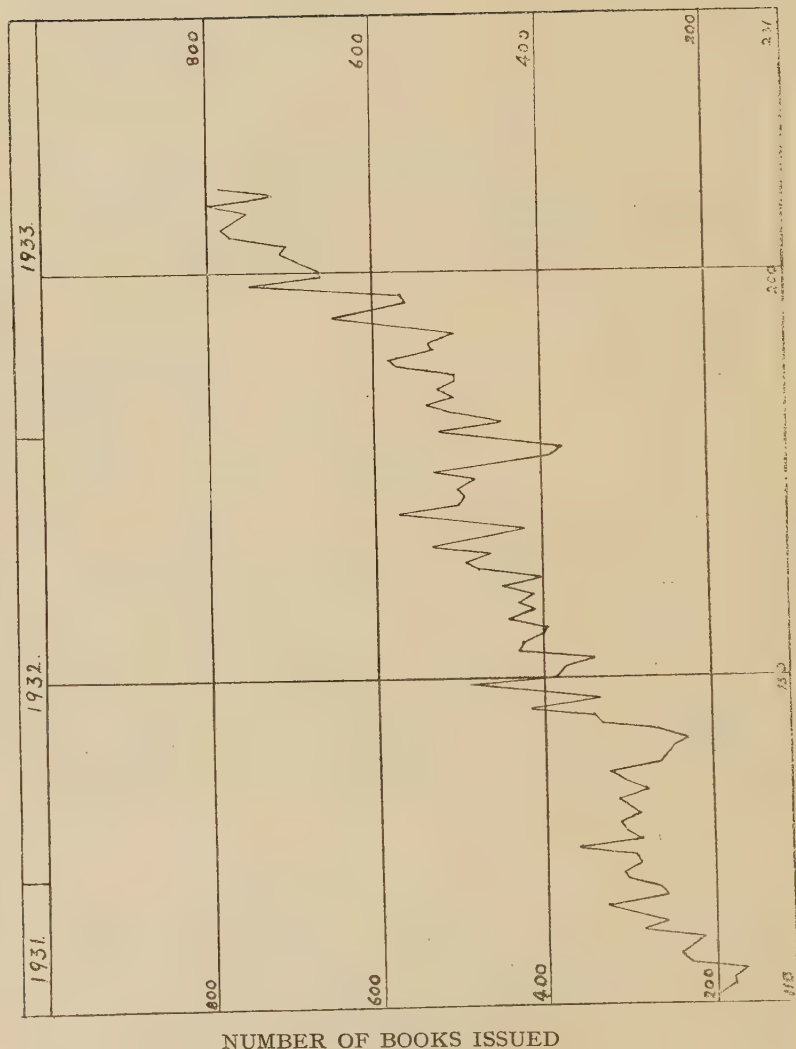


FIGURE 1.

NUMBER OF BOOKS ISSUED PER ABSTRACT SHEET, 1931-33



ABSTRACT NUMBER. FIGURE 2.

- (F) Obtaining from departmental managers a note of the technical institutions in which they are members.
- (G) Issuing instructions to departmental managers that all orders for literature of any description should pass through the Bureau.
- (H) Issuing instructions to all departmental managers that all patent work would be undertaken by the Bureau.
- (J) Opening an account with the Patent Office for the purchase direct of patent specifications and forms, and the supply of the Journal and Abridgements.
- (K) Ordering all periodicals through one agent.
- (L) Taking out membership in ASLIB.

It may here be stated that it was originally the intention to incorporate in the Bureau a central reference library. However, after fuller consideration of the scattered nature of our various departments it was decided that such a scheme would not be practicable. Had it been insisted upon there is no doubt that a great deal of time would have been wasted by departmental managers and their staffs having to leave their offices to consult at the library. Also, and what was perhaps more important, friction with the Bureau might have resulted. This would have been fatal, as no information bureau can hope for success unless it maintains the most cordial relations with all departments. At the moment, therefore, only text-books of a general nature and bound volumes of periodicals in general use are housed in the library, together with all patent volumes, catalogues, and four years' copies of unbound volumes. (Four years happens to be our maximum capacity.) After a four-year period old volumes go to a store.

The above preliminaries settled, the necessary machinery affecting each was put into operation and weekly abstracts commenced. The first issue consisted of six typewritten copies which were circulated to directors and managers only. The idea immediately appealed to them, and it was decided to issue copies to the staff generally. This resulted in numerous applications for periodicals, all of which were dealt with in odd moments and without increase of staff. This state of affairs lasted for about two years, during which time a suitable office, centrally placed, had been obtained and the literature collected moved into it.

Requests for all kinds of information kept pouring in, together with an ever-increasing number of requisitions for books. Figure 2 shows graphically the increase in number of periodicals (only) issued during the past two years. The increase, it will be observed, is about 600 per week. The periodic rises in the graph each indicate the results of some new feature which has proved a success. Examples of these features are the marking of special articles to individuals and the use of the front page of the abstract as a requisition form.

With the ever-increasing volume of work it became necessary to obtain assistance. A lad from another department was commandeered to deal with the distribution of books, and the Assistant Chief of the Technical and Patent Department (of which the Bureau forms part) undertook to do the indexing and to assist with abstracting and other matters when not engaged on other work.

Simultaneously with the growth of interest in general literature there was distinct evidence of "patent-mindedness" developing in all departments. Not only was more interest taken in the perusal of other people's patents, but patentable inventions became very numerous with obvious advantages to the company. This was highly gratifying, since the inter-relationship between technical and patent literature is very close, and therefore a considerable saving of time was effected by the close correlation of work on both.

DETAIL ORGANISATION.

It is now proposed to discuss in some detail certain of the methods employed in dealing with Items 1-14 covering the functions of the Bureau.

(1) RECEIVING AND CIRCULATING, ETC.

All publications received, whether purchased copies or voucher copies, are placed in the "In" basket, Table A, Figure 1, from which they are transferred to the pigeon-hole in Rack B marked "New Books In." They are then stamped with the company's stamp, registered, and the company's advertisements cut out, before being placed in the pigeon-hole marked "Books to be Abstracted." When abstracted they pass to "New Books Out," and subsequently in time to "Books in Circulation," and finally to "Books to File." They are then transferred to shelves and either in time bound or placed in a store. The same procedure is, by the way, adopted with patents and patent abridgements. The Rack B is one of the most useful fittings we could have "found," as it shows at a glance not only the amount of work in hand, but the stage which it has reached.

The register for books received is in two parts, one for weekly books and one for monthly. We found this preferable to having them together, as it facilitates examination. Sheets are drawn up from time to time by the boy and added when required to the file which holds them. The register arrangement is shown in Figure 3 and it is self-explanatory.

One of our chief aims is to get publications into circulation as quickly as possible and we therefore adopt the following procedure. Where more than one copy of a publication is received the remainder are numbered 2, 3, and so on and are immediately put into circulation. Certain books go to the management at once, while others go to those who are on our list of regular readers. Labels of the type shown in Figure 4 are affixed to all books before issue. These labels are kept in sizes varying from five lines to seventeen lines. Names of readers are typed on to them and a record kept. It will be noted that the last reader in each department must return the book to the Bureau, where it is again booked in and out. This entails a little extra labour, but it was found to be absolutely necessary in order to keep track of them. The column "You wanted to see page" enables a reader who may be the last on the list, and have forgotten what he requisitioned, to turn at once to the article he desired to read.

In the early stages we had difficulty with certain people holding up books, but we now have them on the "black list," and place their names last on all lists and generally keep chasing them. Occasionally we find it necessary to send out special appeals to offenders,

REGISTER OF PERIODICALS RECEIVED.

WEEKLY PUBLICATIONS.

Month			July			August
Week Ending	1	8	15	22	29	
Autocar	30**					
Mod. Transport ..	1*					

Note: In the case of weekly publications date recorded is the date of publications.

MONTHLY PUBLICATIONS.

Month			July			August
Week Ending	1	8	15	22	29	
Efficiency Mag. ..	Recd.					
Locomotive			Recd.			

Note: In the case of monthly publications the record shows the week in which the publication is received.

* Equals 2 copies received.

** Equals 3 copies received and so on.

FIGURE 3.

IMPORTANT.

The LAST reader in EACH DEPARTMENT must return this publication to the Technical Department, Scotswood Works. Each reader should complete the date and initial columns.

ABSTRACT No.

TITLE OF BOOK..... DATE.....

Name	Dept.	You wanted to see page	Date passed to you	Date passed on by you	Initials
Mr. A.	Loco.				
Mr. B.	Do.				
Mr. C.	Do.				
Tech. Dept.					
Mr. D.	D.E.T.				
Mr. E.	Do.				
Tech. Dept.					
Mr. F.	Gen. Eng.				
Mr. G.	Do.				
Mr. H.	Do.				
Tech. Dept.					

FIGURE 4.

and we use the front page of our abstract for this purpose. Books when ready for issue are placed in their appropriate divisions on Table "A," Figure 1, and are collected and distributed by the internal postal system.

The method of requisitioning is by means of the bottom half of the front sheet of the abstract (see Figure 7). Being all one size, these forms are readily handled. They are delivered by the post boys into the basket "C," Figure 1. It takes about one and a half to two days for all requisitions to arrive, and they are left for that period. The next step is to sort them out into departments, and when this is done the requests on each requisition are transferred to a sheet of foolscap, on which the names and dates of the various books are written. This gives a list of names in departmental order under the book title. In a filing cabinet are kept files with the names of books regularly received on them. In these files are kept the lists of regular readers, and loose sheets (one for each book) to which are added the weekly requests.

The procedure is as follows. The names of departmental managers receiving a publication regularly are divided by the number of books available and the books issued to them. By the time they are returned the special requests have been added, in departmental order, to the list of standing requisitions from the staff. Three copies of the list are made for each book. One goes into the book file, one is pasted on to the book, and one goes to the departmental chief, who appoints a junior to see that the book is circulated. All sheets which are to be pasted to books are kept in a separate file until the books are returned by the management. The sheets are examined daily, and if a book has been too long in circulation the reason why is ascertained.

We have tried other systems which have appeared to be simpler, but in our experience the one described is the best.

FILING CLASSIFICATION.

All books and book files are classified under eight sections—*viz.*,
A—H :

A includes Business and General Information.

B includes General Engineering, etc.

C includes Locomotives, Railway, etc.

D includes Shipbuilding, Marine Engineering, etc.

E includes Automobile, Diesel Engines, etc.

F includes Foundry, Die Casting, etc.

G includes Pneumatic Tools, Air Compressors, etc.

H includes Boilers and Fuel General.

Patent literature has the code letter J.

Technical institutions' papers and volumes, K.

Where we have yearly or half-yearly volumes they are denoted by the letters a, b, etc.

Thus the bound volumes of the *Locomotive*, which we have from 1929, are coded Cia to Cid, and the *Railway Engineer* C2a to C2d. A complete index is kept and this forms the library catalogue, which is issued to all senior and junior managers and departmental chiefs.

Including works magazines, trade publications, voucher copies, and periodicals purchased, we have on our lists at the moment exactly one hundred publications. Of these, we purchase exactly twenty-five at a total weekly cost of 7s. 8d.

ABSTRACTING.

Where time permits, we endeavour to abstract books as soon as they arrive. This gets them into circulation and does not throw so great a burden on the abstractor and typist. Free copies not regularly received are first examined and, if not abstracted, laid aside for six months and then scrapped. Those abstracted are stamped "Abstracted Pages" Pages abstracted are later transferred to a loose-leaf box file and indexed. Books received regularly are then examined, and if they contain information of interest to the company, abstracted. It should be noted that in some publications the contents index only mentions the principal articles, whereas information of value is often contained in quite short and seemingly unimportant articles.

The following three methods of abstracting are in use :

- (a) Writing them out in pencil.
- (b) Writing and dictating.
- (c) Dictating.

(a) This method is laborious and is only resorted to when the stenographers are "snowed up" and the abstractor is anxious to get books into circulation. It has, however, this advantage—that it impresses details in the abstractor's mind.

(b) It frequently happens that abstracts are undertaken at home, particularly on week-ends, when a number of books may be read. Rough notes can then be made, and the remainder of the abstract dictated. Parts to be dictated should be marked in soft pencil. This method is also on occasions employed in office hours.

(c) This is by much the simplest and quickest method, and to those with a flair for abstracting very simple and speedy after a little experience. Experience is, however, essential to speed, and it amounts to the abstractor being able to tell almost at a glance where an article will contain useful information. The author's name will, for example, be an indication of the possible value of an article, or the institution to which the paper (if it be a paper) has been submitted. Where papers have already been read by the abstractor, the discussion will usually contain some useful facts, or will give food for further thought.

To abstract in this manner one simply picks out the "meat," marks it by soft pencil, and then either enlarges on it, or condenses it when dictating, and where possible instructing the stenographer to copy parts marked.

When a number of books are being abstracted at the same time, paper clips should be put in the pages to be abstracted. These are removed by a lad and the pencil marks rubbed out after the typed sheets have been corrected and edited. After editing and checking, stencils are cut and copies run off on foolscap size paper.

ARRANGEMENT OF ARTICLES, ETC.

The form in which the abstracts are drawn up is shown on Figure 5 and is one which the writer adopted for personal use many years ago.

BULLETIN OF THE INTER. RLY. CONGRESS ASSOC.
AUGUST, 1933.

- P. 710. New Suburban Tank Locomotive with Cossart Valve Gear. A description is given of the first of an order of 34 engines of this type for the French Nord Railway. Cossart valve gear is fitted and the camshafts are driven by a simple articulated system of levers which in addition partially balances the inertia forces of the reciprocating parts. In ordinary working the running cut-off position is 7%, giving a greater range of expansion than in any of this railway's best compounds. 10% cut-off is sufficient to maintain a speed of 69.9 miles per hour, with a train of 475 tons on a continuous up grade of 1 in 200.
- P. 722. Goods Locomotive fitted with Dabeg Poppet Valve Gear. The engine described has been built to the order of P.L.M. Railway, and is of the 2-10-2 type with 4 outside cylinders, compound. The first two pairs of coupled wheels are driven by the low-pressure cylinders and the three other coupled pairs by the high-pressure cylinders. The poppet valve gear gives seven cut-offs in forward gear and three in reverse, and the hand-operated reversing gear has a leverage of 49.3 to 1.

FIGURE 5.

STEEL ABSTRACTS.

- C. 788. PROPERTIES OF NICKEL ALLOY STEELS CONTAINING MOLYBDENUM.

'Steel,' 15.5.33 and 22.5.33—P. 23.

An account of the comp., treatment, and properties of a range of *Ni-Mo* and *Ni-Cr-Mo* steels developed by a leading steel mfr. Properties are charted for steels within the range C, 0.3—0.9; Ni, 0.5—2.0; Cr, 0.25—1.10; and Mo, 0.15—1.24%, and the applicns. of the various classes of steel are discussed.

- C. 789. TITANIUM ADDITIONS TO NICKEL CHROMIUM STEELS. J. Arend and M. Lobe, St. & Eis. 8.6.33.

FIGURE 6.

Page.....will interest YOU, Mr.....

ABSTRACT SHEET No. 2II.
From
TECHNICAL PUBLICATIONS
for
WEEK ENDING 12th AUGUST, 1933.

"Nobody ever got anywhere by waiting." Doing something even if you do it wrong is better than doing nothing at all.

The longer a man waits, the less he is likely to act. Waiting becomes a habit.

No matter what the situation is, there is always something that can be done to make it better.

There are always risks and difficulties in acting, but it is far more dangerous to wait than to act.

—*The Efficiency Magazine.*

JOSS/PET/KmE.

ABSTRACT SHEET No. 2II.

Please use this form when requesting the loan of books (other than those sent regularly) and forward to the Technical Department, Scotswood Works.

Name..... Department.....

Title of Book.	Date of Book.	Page of Interest.

FIGURE 7.

It takes up a little more space than the type shown on Figure 6, but it is clearer and perusal of headings is facilitated.

The arrangement of the front page is shown in Figure 7. Articles of special interest to individuals are not only indicated thereon, but the actual articles are marked in red pencil. This feature, together with that of the requisition form, are the most useful features yet introduced. The efficiency message culled from the *Efficiency Magazine* is read and digested by the efficient and laughed at by the sceptics, whom, we learn, have dubbed it "The Wayside Pulpit."

In order that the directorate and senior managers may be saved the trouble of asking their staff if they have studied a certain article, specially typewritten sheets are attached to their copies which indicate to them the names of all readers who have received abstracts with articles marked for their attention. The articles so marked are, of course, indicated on the special sheet.

Articles are not classified or sectionalised in the abstracts for the following reasons. In the first place, the staff—draughtsmen particularly—are not infrequently moved from one department to another, and we find that they prefer to have the whole abstract. Secondly, in mixing the subjects up, we believe that there is more chance of the whole abstract being read. We are anxious that this should happen, because it is essential that a man in the pneumatic tool department, say, should keep himself *au fait* with, for example, diesel engines or hydraulic clutches, both of which may be used on a compressor set.

(2) CARD INDEXING.

A considerable number of abstracts had been written before we found it necessary to have a card index. Prior to it, we relied upon our memories to locate articles or information. Now we have a complete index covering all articles mentioned in the abstracts.

The type of card used is shown in Figure 8. They are ruled up by the lad as and when required. Blue cards indicate the alphabetical divisions and yellow ones title divisions. For example, to locate springs for automobiles the letter "A" is referred to; then a yellow card shows "Automobiles" and a sub-division "Automobile Suspension." In order to save time in referring to various cards, we keep a Master Key, which is a notebook with the edges marked A to Z. Thus, upon looking up "Springs," the reference "Automobile Suspension" is given. An analysis of the time taken to index was made some time ago. The results are given below.

Attention is called to the variation in the number of entries which indicate cross indexing, and it will be noted that the average time per article is about two minutes.

Abstract No.	197	198	199	200	207	202
Time taken in minutes . . .	135	65	37	45	64	135
Number of Articles . . .	66	34	19	24	38	66
Number of Entries . . .	83	39	28	28	39	83
Average Time per Entry in minutes	1.63	1.67	1.32	1.62	1.63	1.62
Average Time per Article in minutes	2.05	1.91	1.95	1.88	1.68	2.05

Automobiles		Suspension		
.....				
Subject of Article.	Name of Book.	Page No.	Date.	Abst. No.

Card 6in. × 4in.

FIGURE 8.

(3) DISTRIBUTING ABSTRACTS.

Little need be said about this, as they are placed in their appropriate divisions on Table A after "Specials" have been marked.

(4) OBTAINING AND DISTRIBUTING CATALOGUES.

All leading journals make reference from time to time to catalogues received by them, and we make full use of this, while we also examine advertisements. We have a standard form for application headed: "Technical Department" (Library) and a corresponding acknowledgement letter. Applications are issued in batches of twenty, because they are then accepted by the postal authorities at the rate of one halfpenny per letter.

(5) REGISTERING CATALOGUES.

Some little difficulty has been experienced with this, because some people refer to manufacturers' names, while others refer to their products when requesting catalogues. We therefore keep two book registers alphabetically arranged. In one we index under the title of the product and label the catalogue from it. In the other we cross index under the manufacturer's name.

(6) ADVANCE COPIES OF TECHNICAL INSTITUTION PAPERS.

Out of thirty-three institutions written to only one refused to send us advance copies. All others were most enthusiastic and we regularly get advance copies. In return for this service we circulate the papers, post notices in the works and offices, and do our best to get our staff to attend meetings and take out membership. For the latter purpose we can supply application forms and all details to intending members.

(7) MONTHLY CIRCULARS.

We used to issue monthly a special bulletin giving full details of all the principal papers to be read to technical institutions, but we found this impracticable because by the time they were issued some of the meetings had taken place. We now incorporate the information in our abstracts, giving the name of the institution, subject of paper, place of meeting, date, and, when possible, the time of the meeting.

(8) POSTING OF NOTICES.

Notices are circulated to the works and posted on the usual notice boards, but in addition to this we have a special board outside the Technical Department. It is divided into three vertical portions. In the centre we have one of "Bill Jones's" (American, alas!) efficiency posters. On one side of this we have a heading in red and white "For special attention," and on the other side "For immediate attention." Notices of meetings about to take place go on to one side and are transferred to the other the day before they are due to be read. On the day they are due we pin on to the board a large red arrow on which is written "To-night." When this is done we feel that we have done our duty and that no one can blame us if they have not knowledge of a meeting.

(9 AND 10) PATENT ABRIDGEMENTS.

Patent abridgements are now printed on loose sheets and reach subscribers each Saturday. They are carefully examined and sent out to the departments or individuals whom we know they will interest. Specially-ordered specifications are also distributed. We use envelopes for this purpose and the standard label. After circulation they are filed and finally bound. We have now in our library bound volumes of the Journal and Abridgements covering the past four years. They are of inestimable value to us, as searches can be made in the office instead of having to go to the local library, which is a considerable distance away.

The *Patent Journal* is received weekly and carefully examined. Where a patent appears to be of particular interest we order a copy, examine it, and when necessary pass it on to the department concerned with our comments on its probable validity. If we are in doubt about the latter we file the necessary form to obtain citations and in some cases make a search for prior art. In this way each department is kept right up to date with patent information relating to it.

(11) REVIEWING, ETC.

We keep in touch through the technical press and otherwise with all new publications, and when they appear to be of likely value we obtain a copy on approval and pass it to the departmental manager concerned for his opinion. If he considers it should be purchased we find out what interested him and then make sure that the information does not exist elsewhere before we purchase it.

(12) OBTAINING INFORMATION UPON REQUEST.

When our own resources fail, we try the local libraries and technical institutions, and when all fails, but not until then, for they are very busy people, we write to ASLIB. So far ASLIB (the Association of Special Libraries and Information Bureaux) have not failed us. From information on colloidal fuel to the weight of cow's milk they have helped us through! Would that the writer had known of their existence some years ago.

(13) CATALOGUING PUBLICATIONS.

As each new publication is received it is given a class index number, labelled, and full particulars are noted in the sheets already mentioned elsewhere. If it leaves the Bureau to be housed elsewhere its location is noted.

(14) GENERAL ADVICE.

It will have become obvious to readers ere this that as the functions of a Research Bureau became known its activities and knowledge must spread. The result is that no matter what the subject is, a member of the staff in doubt instinctively turns to it for help.

We make no personal claims to great knowledge, but we work on the principle that no matter how small and apparently insignificant a request may seem, it must have attention and the enquirer must be satisfied. So far we are able to boast that we have not yet been "stumped."

Facsimile Processes: with special relation to Tabular Matter

By NORMAN PARLEY

SOME have editing thrust upon them; and with it, production; and with it, need for stern economy. Such must be puzzled, at beginning, to know what work is suitable for duplicators, in the office or out of it, and what for printing machines. Mr. Clarkson's admirably succinct paper helps greatly where illustrations are concerned, and lays some emphasis on the little known photo-litho printing processes; it is on recent developments in that direction I shall mainly speak to you, omitting tone illustrations, and dealing with text, diagrams, and tables.

The number to be printed and the degree of quality and permanence required, may solve off-hand the question between duplicator and printing machine. All material that goes to the public, even to the technical public, should be printed; but memoranda for internal or House use, and even for technical coteries or associations, may well be duplicated—unless permanence, for reference, is required. In general agreement with Mr. Clarkson I should put the range of number, for duplicating, from say 12 to 250; and, for printing, from 500 upwards, with maximum efficiency at and above 1,000. But ink, paper, and unity (binding) have to be considered. A.S.L.I.B. members will remember the conclusions reached on durability of ink and paper. No duplicating ink is permanent and no duplicating paper, the latter needing to be porous, and therefore unsized. In both these respects printing ink always, and printing paper usually, is durable. Also, the printing machine deals in flat sheets, naturally suitable for gathering and folding in units. Print insensibly carries prestige.

At the 1928 Conference I spoke to you on "Reproduction of Books and Manuscripts," describing and illustrating the uses of the available processes; and in the three appendixes published in the Report of Proceedings, gave costs for 50, 100, 500, 1,000, and larger numbers of book or pamphlet reproduction, by letterpress, collotype, or replika photo-litho (these being printing processes) and by photostat (a purely photographic process). Those comparative costs are as applicable to-day as they were in 1928. But since then I have been investigating the adaptability of our old friend the typewriter, with very satisfactory results, for the production of originals to be photographed down for litho-offset printing. It is a kind of middle course, cutting out the use of metal types from the composition end of printing. It shows little benefit for straight text, but astonishing advantages for tabular matter.

The specimen page you have in your hands, marked A, is from a meteorological journal, which was set in the ordinary letterpress way; the cost of composition will have been 31/6 per page. The specimen page B shows the same page but composed by typewriter, at a cost of 13/- per page. But you will notice that B contains 50 per cent more matter. Taking these two factors together there is a saving of 70 per cent, or 34/3 per page. Multiply this by the number of pages in the book and one arrives at the saving effected; for the machining and

binding costs may be taken as the same by letterpress or by photo-litho.

Symbols can be fitted on a full-size brief typewriter, which has ninety-two keys, to the number of about sixteen or twenty, without interfering with the use of the machine for text matter. And this number can be increased considerably by slight additions to the typescript, made in Indian ink. For instance, the meteorological symbol $\oplus$ can readily be made from $\odot$ by a stroke or two of the pen. But should the whole of the greek alphabet be required, in addition to the roman one, as happens in some astronomical works, the sheet is best run through again on a second typewriter.

Alterations are very easily made by this method, either in the first case or when correcting, and this can be done direct, by Indian ink and process white, or by pasting over a square or section, typed on opaque paper, on the typescript.

In one volume now being reproduced for H.M. Stationery Office from new MS., there are nine main sets of framed tables and a certain number of individual tables. For the main sets, litho-printed forms will be supplied to the typing department. But the first stage is to produce a specimen typed page, with exact attention (*a*) to digit width; (*b*) to proportions of page, leaving the column headings to be dealt with later. See examples, too large to print here as illustrations. Where the column headings are the same for many pages, it is best to print these and paste down on to the typescript.

The typed specimen page, when approved, goes to be hand-ruled; this framework is then litho-printed on to typing paper. The typist makes two copies. The top-copy, on the framed form, is retained for possible corrections. This is the one that will be photographed—probably to a reduced size—and reproduced. It has a black carbon paper reversed on to its back, giving greater density for the camera. A duplicate copy is made simultaneously; and this goes to the editor for correction, with relative MS., usually in sections, as ready. Incorrect digits or words are encircled in pencil and the correct ones written in the margin. On return, corrections are made on the top copy, with Chinese white and typewriter. and the sheets are collected and sent to the composing department for addition of pagination, prelims, and typed or printed index. The book is then ready for machining.

Illustration D shows an application of typescript to library additions, a very suitable place for economy, especially as, by following a few simple rules, a member of the staff can prepare the typescript, with the incidental advantage of cutting out proof reading.

E and F are from manuscript. E solves the heavy expense of setting up mathematical matter and making line blocks for diagrams, for theses. F reproduces a distinguished handwriting.

G is a reprint from a Journal of eighty years ago, containing illustrations in the text for which the blocks no longer exist.

H is mostly type-set, but with rulings and symbols added by hand, in a way impossible to the letterpress printer. This is another application to tabular work.

I is another mathematical example, of a Plate of fine diagrams greatly reduced photographically.

The process is suitable for almost any tabular work, of 32 pages and upwards. The longer the book the greater the saving. In suitable cases this saving will exceed 50 per cent on total cost.

ILLUSTRATIVE EXAMPLES OF
REPLIKA REPRODUCTION

Specimen

- | | |
|-------|--|
| A B C | From the Phenological Report, Royal Meteorological Society. |
| D | From Newport (Mon.) Library Catalogue. |
| E | From Intermediate Pure Mathematics, R. G. Allen (Lond. Sc. Econ.) |
| F | From 'Moments,' A. J. K. Esdaile, M.A. |
| G | From 1848 original, Taylor & Francis. |
| H | For Braithwaite & Co. (Engineers) Ltd. |
| I | From Quarterly Journal of Pure and Applied Mathematics, Bowes & Bowes. |

TABLE XI.—ARRIVAL OF SPRING MIGRANTS, 1931.

STATIONS. (160 selected out of about 400 of our observers, besides several from periodicals.)	Mean Value.*													Chiffchaff (<i>Phylloscopus rufus</i>).	2	Wheat (<i>Saxicola cinerea</i>).	3	Willow Warbler (<i>Phylloscopus trochilus</i>).	4	Sand Martin (<i>Cotile riparia</i>).	5	Tree Pipit (<i>Anthus trivialis</i>).	6	Blackcap (<i>Sylvia atricapilla</i>).	7	Sandpiper (<i>Totanus hypoleucos</i>).	8	House Martin (<i>Chelidon urtica</i>).	9	Whitethroat (<i>Sylvia cinerea</i>).	10	Lesser Whitethroat (<i>Sylvia curruca</i>).	11	Sedge Warbler (<i>Acrocephalus phragmitis</i>).	12	Garden Warbler (<i>Sylvia hortensis</i>).	13	Swift (<i>Cypselus apus</i>).	14	Cormorant (<i>Graculiformis</i>).	15	Turtle Dove (<i>Turtur communis</i>).	16	Nighthawk (<i>Caprimulgus europaeus</i>).	Mean of Nos. 1 to 5.	Mean of Nos. 6 to 13.	Mean of Nos. 13 to 20.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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TABLE XI. - ARRIVAL OF SPRING MIGRANTS 1932.

STATIONS.	Mean Value	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Mean of Nos. 1-5	Mean of Nos. 6-12	Mean of Nos. 13-20
A (i) Oe. Gurnsey	115.5	71	75	113	98	120	120	96	113	122	122	117	117	119	123	122	131	130	130	125	95.4	115.4	128.1	
Oe. Jersey	112.7	86	82	94	87	95	96	114	108	107	111	117	117	119	123	122	131	127	127	125	91.4	111.4	127.3	
A (ii) la. Carbis Bay	113.7	86	82	94	87	95	96	114	108	107	111	117	117	119	123	122	131	127	127	125	91.4	111.4	127.3	
5g. Polperro	115.5	85	77	94	98	93	106	101	113	122	105	122	122	118	106	129	127	126	126	141	92.8	114.4	125.4	
6a. Duloe	115.3	85	77	94	98	93	106	101	113	122	105	122	122	118	106	129	127	126	126	141	92.8	114.4	125.4	
8c. Looe	112.1	84	86	97	118	92	106	101	113	122	105	122	122	118	106	129	127	126	126	141	92.8	114.4	125.4	
10f. Chumston	117.8	90	86	97	118	92	106	101	113	122	105	122	122	118	106	129	127	126	126	141	92.8	114.4	125.4	
13e. Exeter	114.3	86	80	97	118	92	106	101	113	122	105	122	122	118	106	129	127	126	126	141	92.8	114.4	125.4	
14a. Umberleigh	116.5	86	80	97	118	92	106	101	113	122	105	122	122	118	106	129	127	126	126	141	92.8	114.4	125.4	
15h. Tipton St. John	112.3	89	73	111	105	96	110	113	109	113	117	117	117	117	117	109	128	137	140	137	97.4	117.0	130.4	
17b. Comemartin	114.9	89	73	111	105	96	110	113	109	113	117	117	117	117	117	109	128	137	140	137	97.4	117.0	130.4	
20a. W. Porlock	115.7	92	84	103	93	113	120	104	112	109	121	125	125	126	131	129	129	139	135	122	98.6	114.0	128.6	
21c. Sturminster M'shall	117.4	96	94	112	101	116	104	112	109	121	125	125	125	126	131	129	129	139	135	122	98.6	114.0	128.6	
22b. Parkstone	114.8	92	94	112	101	116	104	112	109	121	125	125	125	126	131	129	129	139	135	122	98.6	114.0	128.6	
25i. Pilton	118.1	90	94	112	101	116	104	112	109	121	125	125	125	126	131	129	129	139	135	122	98.6	114.0	128.6	
27e. Long Ashton	116.3	94	94	112	101	116	104	112	109	121	125	125	125	126	131	129	129	139	135	122	98.6	114.0	128.6	
A (iii) 23i. Megor	117.2	91	88	108	111	108	109	108	114	119	107	126	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
30a. Mumbies	117.7	91	88	108	111	108	109	108	114	119	107	126	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
34d. Carmarthen	113.6	84	79	110	113	103	109	108	111	119	107	126	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
34e. Laugharne	114.5	86	76	105	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
B 6a. Aberystwyth	114.9	91	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
22b. Tioleleague	117.8	91	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
37b. Castle Lyons	117.8	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
37b. Kilmick	117.8	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116	116	116	117	147	98.0	116.9	128.9	
43b. Stradbally	116.3	92	84	106	95	91	113	115	115	111	115	122	127	124	129	116								

TABLE X. - MEAN DATES (DAY OF YEAR) OF SONG AND MIGRATION OF BIRDS AND FIRST APPEARANCE OF INSECTS IN 1932, AND DIFFERENCE FROM THE AVERAGE OF THE 35 YEARS 1891 - 1925.

BIRDS AND INSECTS	A (8) England SW.		B (10) Ireland S.		C (5) England SE.		D (4) England Mid.		E (3) England E.		F (7) England NW.	
	1932	Average 35 years. Diff. from Average.	1932	Average 35 years. Diff. from Average.	1932	Average 35 years. Diff. from Average.	1932	Average 35 years. Diff. from Average.	1932	Average 35 years. Diff. from Average.	1932	Average 35 years. Diff. from Average.
1. Song Thrush First-Heard	8	15 - 7	6	12 - 6	7	14 - 7	10	19 - 9	9	16 - 7	12	24 - 12
2. Swallow First Seen	104	105 - 1	106	105 + 1	110	105 + 5	111	109 + 2	109	109 - 0	113	110 + 3
3. Cuckoo First Heard	112	111 + 1	118	116 + 2	110	107 + 3	115	112 + 3	112	111 + 3	119	117 + 2
4. Nightingale First Heard	120	120 0	...	...	120	112 + 8	123	117 + 6	122	114 + 8	...	122 ...
5. Spotted Flycatcher First Seen	134	134 0	140	135 + 5	136	132 + 4	138	135 + 3	138	135 + 3	137	131 + 6
6. Swallow Last Seen	285	282 + 3	272	278 - 1	279	282 - 3	281	282 - 1	288	289 - 1	280	279 + 1
Mean of Nos. 2, 3 and 5	117	117 0	121	119 + 2	119	115 + 4	121	119 + 2	120	118 + 2	123	119 + 4
7. Honey Bee at Flowers	80	58 - 8	50	61 - 11	63	56 + 7	70	59 + 11	60	53 + 7	77	65 + 12
8. Queen Wasp on Wing	89	96 - 7	100	99 + 1	101	94 + 19	115	101 + 14	101	94 + 7	113	105 + 8
9. Small White Butterfly	114	102 + 12	115	108 + 7	123	103 + 20	134	112 + 22	119	107 + 12	127	114 + 13
10. Orange-Tip Butterfly	140	127 + 13	125	121 + 4	138	127 + 11	142	133 + 9	139	132 + 7	142	136 + 6
11. Meadow Brown Butterfly	171	160 + 11	166	146 + 20	173	164 + 9	178	167 + 11	171	167 + 4	164	170 - 6
Mean of Nos. 7 - 11	113	109 + 4	111	107 + 4	122	109 + 13	128	114 + 14	118	111 + 7	125	118 + 7
BIRDS AND INSECTS												
G (9) Ireland N.	H (5) Scotland N.		I (2) England NE.		J (1) Scotland E.		K (0) Scotland N.		England * and Wales		British † Isles	
	1932	Average 35 years. Diff. from Average.	1932	Average 35 years. Diff. from Average.	1932	Average 35 years. Diff. from Average.	1932	Average 35 years. Diff. from Average.	1932	Average 35 years. Diff. from Average.	1932	Average 35 years. Diff. from Average.
1. Song Thrush	13	20 - 7	19	29 - 10	16	30 - 14	21	28 - 7	31	41 - 10	10	19 - 9
2. Swallow First Seen	108	108 0	113	113 0	113	114 - 1	118	118 0	110	109 + 1	111	111 0
3. Cuckoo	117	118 - 1	120	120 0	117	119 - 2	123	123 0	114	113 + 1	118	116 + 2
4. Nightingale	...	129 ...	...	...	140	120 + 20	...	...	...	...	125	117 + 8
5. Spotted Flycatcher	136	137 - 1	136	140 - 4	133	135 - 2	142	139 + 3	148	138 - 10	136	134 + 2
6. Swallow Last Seen	274	275 - 1	277	275 + 2	286	278 + 2	278	270 + 8	276	260 + 16	284	284 0
Mean of Nos. 2, 3 & 5	124	124 - 1	123	124 - 1	121	123 - 2	127	127 + 1	131	136 - 5	120	119 + 1
7. Honey Bee	72	73 - 1	62	72 - 10	68	64 + 4	49	68 - 19	56	66 - 10	64	59 + 5
8. Queen Wasp	116	109 + 7	116	121 - 5	110	111 - 1	107	117 - 10	106	100 + 6	110	106 + 4
9. Small White Butterfly	117	115 + 2	120	124 - 4	130	119 + 11	135	129 + 6	133	134 1	124	109 + 15
10. Orange-Tip Butterfly	132	130 + 2	154	131 + 23	154	133 + 11	156	131 + 5	153	148 + 10	142	133 + 9
11. Meadow Brown Butterfly	168	165 + 3	179	167 + 11	179	173 + 4	183	172 + 4	172	167 + 5	173	165 + 8
Mean of Nos. 7 - 11	121	118 + 3	126	123 + 3	128	121 + 7	125	123 - 3	132	123 + 4	122	117 + 5

* Average of Districts A, C, D, E, F, I. † The British Isles means in both Tables X and XI are the means of the separate Districts. ‡ The difference between the dates for the Nightingale and the Cuckoo in those Districts in which both have been recorded has been used as a basis for deriving the British Isles means for Nightingales. Values marked # have been interpolated owing to lack of data and are approximate only.

- CLAXTON, WILLIAM J. Paper and printing. Illustrations. Coloured illustrations. [1925?] Rambles among our industries.
CM j676
- COLUMBUS, CHRISTOPHER, (circa 1451-1506). Discoverer of the New World. MITTON, G.E. Columbus. Illustrations. Coloured illustrations. Portraits. Maps. 1927. Peeps at great explorers. CCaM j970B
- COOK, JAMES, (1728-79). Naval captain and explorer. MITTON, G.E. Captain Cook. Coloured illustrations. Portrait. Map. 1927. Peeps at great explorers. CCaM j910.9B
- CRAMPTON, ALBERT H. Leather work, including glove making. pp.63. Illustrations. 1930. "Useful" books.
CM j675
- FAIRFORD, FORD. Newfoundland. 12 coloured illustrations. Map. 1912. Peeps at many lands. CCa j971.8T
- FINN, FRANK. Talks about birds. Illustrations. Coloured illustrations. 1914. C j598.2
- FINNEMORE, JOHN. Holy Land. Coloured illustrations. Map. 1908. Peeps at many lands. C j958.9T
- FINNEMORE, JOHN. Morocco. 12 coloured illustrations. Map. 1910. Peeps at many lands. CM j964T
- FINNEMORE, JOHN. Social life in Wales. Illustrations. Coloured illustrations. Map. 1915. C j942.9
- FOX, FRANK. Australia. Edition 2. Coloured illustrations. 1924. Peeps at many lands. CCaM j994T
- GASK, LILIAN. Hundred best animals. Illustrations. 1932. C j590
- GOLDING, HARRY. Zoo days. 48 coloured illustrations. 1919. C j590
- GRIERSON, ELIZABETH W. Scotland. Coloured illustrations. Map. 1910. Peeps at many lands. CM j941
- GUDGEON, L.W.W. British North Borneo. Coloured illustrations. 1913. Peeps at many lands. CM j991.1T
- HALL, Rev. CHARLES ALBERT. Birds' eggs and nests. Illustrations. Coloured illustrations. 1932. Peeps at nature. CCaM j598.2
- HENDRY, HAMISH. Red apples and silver bells: a book of verse for children of all ages. Illustrations. [1900?] C j821.39
- HENLEY, F.A.H. The Boys' book of cricket. With foreword by P.F. Warner. Illustrations. 1928. CCaM j796.3
- HEWETT, NORA. Peeps at the Union Jack and other principal flags of the British Empire. 8 coloured illustrations. 1928. Peeps series. CM j929.9
- HILL, WENTWORTH, and WOOD, H.G., (Editors). Land of poetry: a series of complete anthologies of English verse for young readers. 5v. Illustrations. 1932. CM j821
- HOPE, ASCOTT R. pseudonym, (i.e. ROBERT HOPE MONCRIEFF). Beasts of business. Coloured illustrations. 1909. C j636
- IKBAL ALI SHAH, Sirdar. Arabia. Coloured illustrations. Map. 1931. Peeps at many lands. C j953T
- JOHNSTON, Sir HARRY HAMILTON, (Editor). Book of great authors. Coloured illustration. [1920?] Boys' library of famous men. C j809
- JOHNSTON, Sir HARRY HAMILTON, (Editor). Book of great sailors. Coloured illustration. [1932?] Boys' library of famous men. C j910.4
- JOHNSTON, Sir HARRY HAMILTON, (Editor). Book of great travellers. Coloured illustration. [1932?] Boys' library of famous men. C j910.9
- JOHNSTON, Sir HARRY HAMILTON, (Editor). Book of great voyages. Coloured illustration. [1920?] Boys' library of famous men. C j910.4

- (1) Write down $\frac{dy}{dx}$, equate to zero and solve. The solutions include all the turning points, but may also include points of inflexion
- (2) Take each solution in turn.

Maximum point if $\frac{dy}{dx} > 0$ on the left, $\frac{dy}{dx} < 0$ on the right of the point

Minimum point if $\frac{dy}{dx} < 0$ on the left, $\frac{dy}{dx} > 0$ on the right of the point

Not a turning point if $\frac{dy}{dx}$ has the same sign on both sides.

Curve Plotting.

Simple curves, $y = f(x)$, can now be plotted roughly by considering the gradient and turning points of the curve. It is not necessary to obtain a large number of pairs of values (x, y)

Examples. (1) $y = x^3 - 3x - 8$.

$$\frac{dy}{dx} = 3(x^2 - 1)$$

$\frac{dy}{dx} < 0$, i.e. y decreases, $-1 < x < +1$

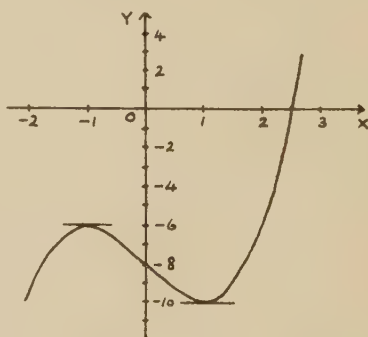
and y increases elsewhere.

$\frac{dy}{dx} = 0$ when $x = -1$ and so $y = -6$
and $x = +1$ and so $y = -10$

The point $(-1, -6)$ is a maximum for $\frac{dy}{dx}$ changes from positive to negative

Similarly $(1, -10)$ is a minimum

When $x = 0$, $y = -8$, so that the curve cuts the y axis at $(0, -8)$



(2) $y = x^3 + 3x^2 + 3x - 2$.

$$\frac{dy}{dx} = 3x^2 + 6x + 3 = 3(x+1)^2 \geq 0 \text{ all } x$$

Hence y increases with x for all values of x

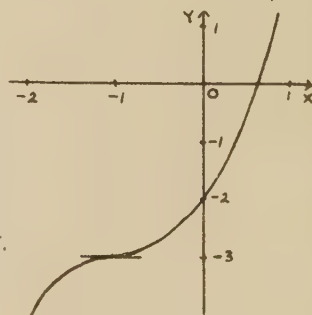
$\frac{dy}{dx} = 0$ when $x = -1$ and so $y = -3$

The point $(-1, -3)$ is a point of inflexion

for $\frac{dy}{dx}$ is positive on both sides of the point.

The curve cuts the axis at $(0, -2)$

Hence the graph is as shown:



A CAT

[Lines on a public official, Mike,
Cat to the British Museum, ob. act.
Sual 19, ut traditur.]

Pigeons, that all my infant wiles withstood,
Not to be caught, first soured my Kittenhood;
Then swelled the cynic rage which these began
At the approach of unofficial man.
I scorned the public as it came and went,
To blandishments and fish indifferent,
But sat for nineteen years and kept the gate,
In every hair an officer of state.

A DOG

[Bozo, a Plum-Pudding Dog, put to
flight by a wire-haired invader.]

For defending till death both his country & gods
The Spartan of old was of all men renowned;
When carried a corpse from the fight against odds,
His wounds in the front of his body were found.

In Dalmatia Canina the converse applies;

For our hero brought home (and 'tis this we bewail)
From a scrap with a terrier half his own size
Not only his life, but a bite in the tail.

THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[SECOND SERIES.]

"..... per litora spargite muscum,
Naiades, et circum vitreos considite fontes :
Pollice virgineo teneros hic carpite flores :
Floribus et pictum, divæ, replete canistrum.
At vos, o Nymphæ Craterides, ite sub undas ;
Ite, recurvato variata corallia trunco
Vellite muscosis e rupibus, et mihi conchas
Ferte, Deus pelagi, et pingui conchylia succo."
N. Parthenii Giannettasii Ecl. 1.

No. 1. JANUARY 1848.

I.—On the Recent British species of the genus *Lagena*.
By W. C. WILLIAMSON, Esq.

[With two Plates.]

WHILST I was engaged upon a memoir on the microscopic character of the Levant mud and other recent and ancient oceanic deposits (printed for the forthcoming volume of the Memoirs of the Manchester Literary and Philosophical Society), my friend W. Reckitt, Esq. of Boston placed in my hands some sand obtained on excavating a well near that place, which I soon found to abound in specimens of *Lagena**. Subsequently

* This interesting deposit can scarcely be called *recent*, being probably several thousand years old, and yet its geological character is not such as to justify its organisms being introduced into the category of fossils; being merely a beach which has been left permanently dry by the tide. When I wrote the memoir above referred to, I stated "that a considerable portion of the Fen district was once an estuary, which has undergone considerable changes even since the time of the Roman invasion; the old sea-bank having, at that comparatively recent period, been much further inland than at present" (Memoirs of the Manchester Literary and Philosophical Society, vol. viii. p. 56). This estuary has been gradually filled up, the elevation of the coast or the recession of the ocean causing the sandy debris, once forming the bed of the latter, to be converted into dry land, and afterwards covered over with a layer of vegetable mould. Mr. Reckitt's specimen was obtained from a depth of seven feet below the surface, where he found a very fine sand containing carbonaceous fragments, and a large number of the Foraminifera and other microscopic organisms still characteristic of our existing sea-beaches, including many of the rarest as well as the most

Ann. & Mag. N. Hist. Ser. 2. Vol. i. 1

BRAITHWAITE PRESSED STEEL TANK No. 11113

MARKING PLAN

(FOR ERECTION INSTRUCTIONS SEE SEPARATE SHEET)

PLAN D'ENSEMBLE

(POUR LES DIRECTIONS POUR MONTAGE VOIR FEUILLE SÉPARÉE)

PLANTA DE MONTAR

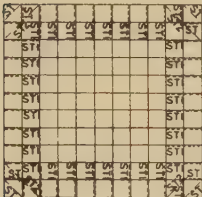
(PARA INSTRUCCIONES DE MONTAJE, VÉASE HOJITA SEPARADA)

MONTAGEZEICHNUNG

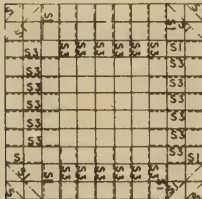
(MONTAGEANWEISUNGEN AUF SEPARATEM BOGEN)

PLANO DE MONTAGEM

(PARA INSTRUÇÕES DE MONTAGEM, VEJA-SE FOLHINHA SEPARADA)

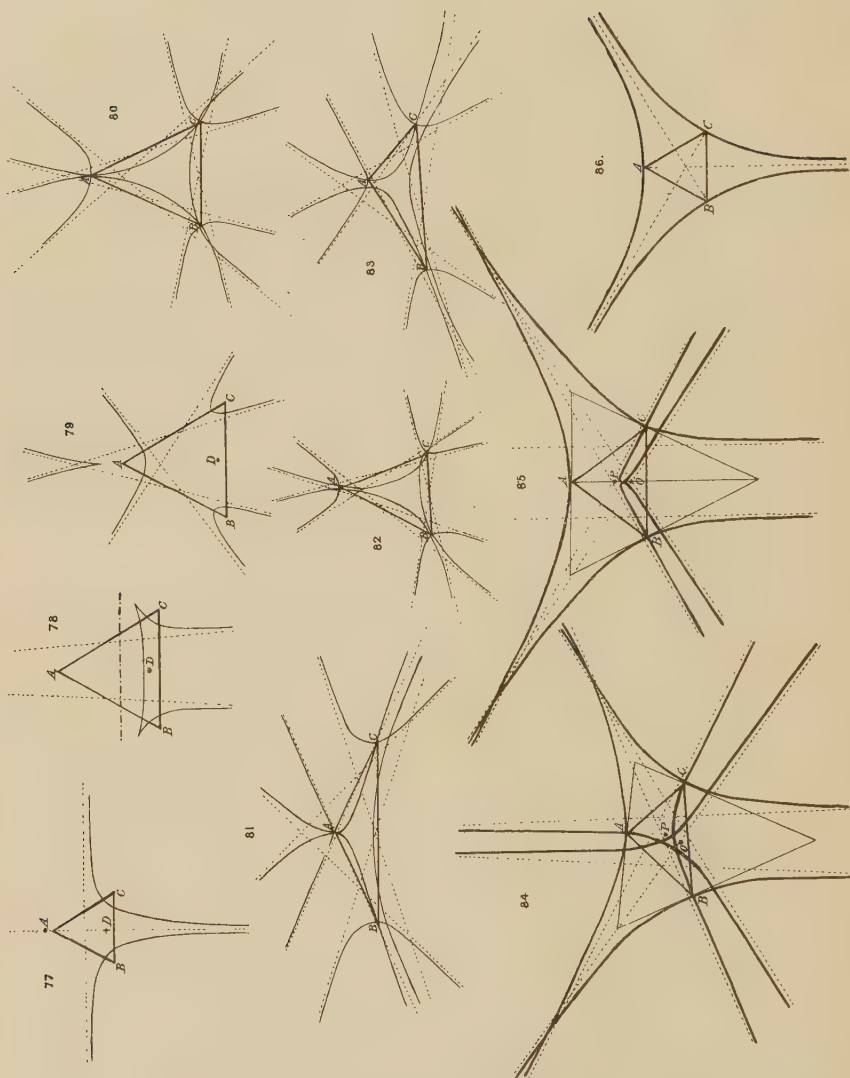


PLAN SHEWING STAYS AT LEVEL X
PLAN DES ETAIS AU NIVEAU X
ANORDNUNG DER VERSTREBUNGEN IN HOHE X
PLANTA DE LOS TIRANTES EN EL NIVEL X
PLANO DOS ESTEOS NO NIVEL X



PLAN SHEWING STAYS AT LEVEL Y
PLAN DES ETAIS AU NIVEAU Y
ANORDNUNG DER VERSTREBUNGEN IN HOHE Y
PLANTA DE LOS TIRANTES EN EL NIVEL Y
PLANO DOS ESTEOS NO NIVEL Y





The Preparation and Reproduction of Illustrations for Technical Reports.

By G. T. CLARKSON.

INTRODUCTION.

The question of reproducing illustrations generally gives considerable trouble to the author or editor of any bulletin for which the full facilities of a publishing firm are not available, except perhaps at prohibitive cost. Heavy waste of time and material is the price that has to be paid for ignorance of the scope and limitations of the various methods of reproduction and of the kind of original required for any particular method.

The aim of the present paper is to explain the principles and possibilities of reproduction methods, more particularly those that can be carried out with office equipment, in order that these principles can be applied to individual problems. The field of duplicating methods, more especially for the text, has been fully explored in Mr. Albert Parker's admirable paper presented at the Sixth ASLIB Conference in 1929, and it is assumed that readers of this article are aware of the information there available. Certain useful processes of limited scope have had to be omitted for considerations of space. Among these is the use of ordinary bromide photographic prints, drawing direct on to wax tissue stencils and the Opalograph process. In addition, no mention is made of many of the processes commonly used in professional printing—*e.g.*, transfer-litho, photogravure, etc.

In the first part of this paper the distinction is drawn between line and half-tone classes of illustrations; the second part gives brief notes on some reproduction methods and is intended to be supplemented by catalogues and price lists supplied by the manufacturers of the necessary equipment and material; the third part is an attempt to provide a link between the many classes of original and the reproduction processes applicable to them, whilst in the last part are given a number of detached items of information which experience suggests may prove useful.

TWO CLASSES OF ILLUSTRATIONS.

There is a clear dividing line between the two very different types of original illustrations; one type corresponds roughly to diagrams and the other type to photographs. More professionally the two types are known as "line" and "half-tone" originals. It is of great importance to grasp the fundamental difference between the two.

(1) LINE ORIGINALS.

In this class are included all diagrams, sketches, and other illustrations of which every portion is either pure black or pure white; other contrasting colours can of course be used, but black and white are the commonest. In this type there must be no area, however

small, of a grey colour ; in other words, there must be no intermediate tones between black and white. Line drawings may, however, include shading in either line or stipple, so long as the grey effect thereby given is obtained by the use of pure black lines or dots and not by watered-down ink. The real test is that it must not be possible to pick out any "dark" that is not composed of pure black.

(2) HALF-TONE ORIGINALS.

This class comprises originals, whether photographs, pencil or charcoal drawings, water colour or oil paintings, whether in colour or monochrome, which fail to pass the test for line originals. By far the commonest examples of this type are photographs. Any ordinary photograph can be seen at a glance to be composed of varying shades of grey (where the colour is black and white), from dark grey approaching black to light grey which is almost white. There may, indeed, be pure black and white areas in it, but the presence of greys definitely places it in the half-tone class. It is so far evident that in the vast majority of cases the test is very easy to apply ; there are, however, a number of borderline cases where a certain amount of experience is necessary before a decision can be made. In the preparation of any original care should be taken to decide from the first into which class it will be made to fall and to prepare it with that end in view. Doubtful cases can only arise when the preparation of the original is outside one's control.

It is important to state here that, so far as ordinary printing is concerned, line diagrams are very much easier and less costly to reproduce than half-tones, and it is always desirable to try to produce the originals so as to fall into the diagram class. The more complicated and costly methods necessarily used for reproducing photographs will equally well reproduce diagrams, although the effect is not quite the same.

SOME REPRODUCTION METHODS.

With the above distinction clear, we may proceed to a consideration of the various possible means of reproduction. The first five methods bear a family resemblance in that they are all contact printing processes on to a slow-speed sensitive paper and the exposure can be carried out on any type of blue print machine. They are all equally suitable for large or small transparent originals, either line or half-tone. The economical limit of number of copies would vary with the size and character of original ; for foolscap folio size (13in. by 8in.) for a line original the figure might be in the neighbourhood of 250 to 300. For a greater number of copies a more strictly printing process such as photo-litho would be less costly.

(1) BLUE PRINTING (FERRO-PRUSSATE).

This process is too well known to need description. It is a cheap and satisfactory method of reproducing line diagrams and to a less extent half-tones. It is a direct printing process and the prints are negatives, but lettering will read the correct way round because the tracing is placed with the unused side in contact with the paper. Positives can be obtained by first preparing a sepia print (*q.v.*) negative

on special thin paper and then using the negative to produce the positive blue print by contact printing. The chief drawback to the blue print process as applied to illustrations is an æsthetic one—the colour is unattractive, especially for half-tones, and looks rather out of place in a bound pamphlet, although a number of blue prints bound at the end of a duplicated bulletin are not noticeably objectionable.

(2) FERRO-GALLIC PRINTING.

This is a direct contact form of photo-printing rather similar to blue printing, but is much slower in operation and is rather liable to reproduce badly from a worn tracing. Development is carried out in a water bath. Its chief advantage is that it gives direct positives—*i.e.*, dark purple-brown lines on an almost white background. It is not greatly used nowadays, but photo-printing firms find a limited demand, as the prints meet certain requirements which are only important in rare cases.

(3) DYELINE PRINTING.

This is a process that has rapidly come into favour in the past few years. It is a direct contact process which gives positive prints covering a very wide range of colours, which includes a close approach to pure black. It is as rapid and at least as cheap as blue printing. Development is carried out by swabbing the surface of the exposed paper with a sponge or cotton wool pad dipped in the special developer which is supplied ready for dissolving in water. Alternatively, a special wet-roller developing device can be used. No fixing or elaborate washing is necessary, and as the print is not wetted right through, drying is very rapid. On account of these advantages the dyeline process has largely superseded ferro-gallic printing and is now generally considered to be the most satisfactory direct-positive photo-printing process. This method can be used for printing half-tones or transparent originals, but if a glass negative were used the resulting print would also be negative. It would therefore be necessary to use a positive transparency to print from.

(4) SEPIA PRINTING.

This is a direct contact printing process on special sensitised paper marketed by Messrs. West and Partners, of London. It gives prints of a pleasing brown tone; these are negatives, but specially thin and transparent sepia paper is available and the print obtained on it can be used very successfully as a transparent negative for all forms of photo-printing so far as line diagrams are concerned; the texture of the paper negative interferes to a certain extent when used for half-tones. The secondary prints are, of course, positives. The sepia process is very simple; the transparent original, whether tracing, glass negative, or sepia print negative, is exposed in a printing frame or blue print machine in a similar manner and for about the same period as for a blue print. The print is then washed for about three minutes and transferred to a fixing bath composed of 2 ozs. hypo crystals to 1 gallon of water and afterwards well washed and dried.

This is a most useful reproduction method, firstly on account of the attractive colour of the prints, which is ideal for reports or bulletins ; secondly, because of the wide scope of the process. Sepia printing involves about double the cost of blue printing.

If an ordinary photographic negative is used to print half-tones from, the ideal type to use is a thin (*i.e.*, not dense) negative of a soft (*i.e.*, not contrasty) character. This neutralises the properties of slow speed and hardness of the sepia paper.

(5) OZALID.

This method of reproduction gives direct positives very similar to dyeline prints. It is, in fact, a dyeline process employing development in a dry state by exposure to ammonia vapour ; there is therefore no drying of prints to cater for. The unavoidable leakage of ammonia may be a slight drawback. Transparent prints can be taken off and used for printing further prints in the same way as a tracing.

(6) TRUE-TO-SCALE.

The next method to be considered is a transfer process, totally different in principle from the first five methods. It gives clear black prints on any kind of paper or on opaque or transparent cloth. The process is only applicable to line originals. For this method a special "table" is required where the table-top takes the form of an endless band of linoleum which passes over rollers, the whole arrangement being designed to facilitate the even spreading of a layer of jelly composition over the lino surface. The jelly can be bought ready prepared, or preferably made up on the spot. A reliable formula is given below.

Ingredients for One 10 lb. tin of Jelly Composition.

2 lb. Gelatin (can be supplied by Rousset and Co., 135, Wool Exchange, E.C.2).

1 oz. Ammonium Oxalate.

4 oz. Crystalline Ferrous Sulphate.

1 oz. "Toro" Ox-Gall. (This ingredient is liable to be troublesome and this make can be recommended ; supplied by Messrs. B. J. Hall. Ox-gall purchased fresh from a slaughter-house is even better than "Toro" and is decidedly less expensive.)

Thoroughly dissolve the chemicals separately in hot (not boiling) water, using altogether a 10 lb. composition tin half full. Mix the solutions together and add to the gelatin. Stir well and heat in a water-jacketed heater for five or six hours.

After use the old composition can be peeled off the lino and re-melted with a little new jelly added.

The layer of composition will take perhaps ten to fifteen minutes to set ready for use. In the meantime a contact print is taken from the tracing on to ferro-prussiate paper specially prepared for true-to-scale work. The fresh unwashed print is pressed by hand on to the composition. If it is a small original it is an obvious economy to use two or more prints for transferring to the composition in order that several impressions can be taken at one inking. The ferro-prussiate print can only be used to give one impression on to the

composition. The offset impression is then inked by using a rubber roller first on an inked slate or plate-glass slab then on the composition. The ink used is black letterpress printers' ink, hard and soft varieties being mixed to a suitable consistency.

A piece of white paper or cloth is then smoothed down by hand over the inked impression. The print dries naturally in a few hours, but drying can be accelerated if necessary by spreading french chalk over it. For a print on tracing cloth the same procedure is followed, but a different ink is used (can be supplied by Messrs. Slater and Palmer, 4, Wine Office Court, Fleet Street). A single true-to-scale print would cost about twice as much as a corresponding blue print, but after the first print the cost falls off almost to blue print level. Where black and white line positives are essential this method is good and economical.

(7) PHOTOSTAT AND SIMILAR.

This method is again quite different from all the foregoing. The principle used is that of photographic copying of the original by a special camera, the image being received on a section of a roll of photographic bromide paper contained in the camera, which section is afterwards cut off, developed, and fixed, all in the same apparatus. Any type of original can be reproduced; it is even possible to photograph objects laid on the copy table. The resulting print is a negative but is the correct way round, the necessary reversal being executed by a right angle glass prism permanently attached to the camera lens, which carries out this function at the same time as it reflects the light rays to give a vertical image from a horizontal copy. The scale of the print is variable within wide limits, but the maximum size is limited by the size of the paper that can be placed in the camera. Focussing is automatic and the whole apparatus is an example of the most foolproof and easily operated form of photographic copying. It can be used in daylight, but for extensive use a dark room is to be preferred. If positives are required the first negative print is re-copied in the machine as many times as required. The paper is supplied in rolls of 350 feet, ready for placing in the machine. Developing is exactly as for ordinary photographic bromide paper, either amidol or metol-hydroquinone developer being used. The special fixing bath is composed of:

Potassium Metabisulphite	.	.	.	$\frac{3}{4}$ oz.
Powdered Alum	.	.	.	$\frac{3}{4}$ oz.
Hypo Crystals	.	.	.	16 oz.

Dissolve in 1 pint hot water and add 3 pints cold water.

(8) PHOTO-LITHO.

In this method the original is photographically copied on to a sensitised zinc sheet, the image then being developed and fixed. The plate is mounted on the cylinder of a printing machine and large numbers of copies can be run off. Black ink on white paper is usually employed. The standard of reproduction is high and the process is eminently satisfactory and economical for large issues. It is, however, definitely a form of printing and is generally carried out by

printing firms, although several forms of photo-litho equipment are marketed for office use and are capable of covering a wide range of work. The process is mainly used for the reproduction of line originals. It can successfully be used for half-tones, but unless a business house specialised entirely in the photo-litho process for all its reproductions, other half-tone processes would be preferable. The method differs from process line blocks for ordinary printing in two main particulars : (1) except for very small originals it is very much cheaper than the line block process ; (2) the metal plate and therefore the original, if possible, must carry all the matter—page number, title, and figure number—as it is impracticable to set up type on the same page, as is easily done with line blocks. Matter which is not on the original drawing can, however, be added direct on to the plate by hand.

(8A) ROTA-PRINT AND SIMILAR.

This system of reproduction is a highly developed form of litho printing from metal plates. In its simplest form it can only deal (apart from letterpress) with line originals drawn direct on to the plates, but with full auxiliary equipment any character and size of original, line or half-tone, can be reproduced to any scale. Alternatively, plates requiring the use of auxiliary equipment can be prepared by the Rota-print dealer and passed to the user for printing with other matter. Like the photo-litho process, it is most economical when dealing with a large output, unless the original is drawn direct on to the plate. Full particulars can be obtained from Kayes Rota-Print Agency, 57A, Holborn Viaduct, E.C.1.

(9) PROCESS BLOCKS.

We have now passed beyond the field of office equipment and have reached methods by which the vast majority of printed illustrations are reproduced. Nothing will therefore be gained by describing the actual processes, but our attention will be confined to the point of view of the printer's customer. Any conceivable form of original, in line or half-tone, black or colour, can be reproduced by this method, but the costs are very different for different originals and vary in direct proportion to the area of the block. The kind of original supplied and the size of block required are therefore important from the cost point of view.

LINE BLOCKS.—These are roughly half to one-third the cost of half-tone blocks and the original should therefore be prepared as a line drawing if this is possible. The original should generally be about one and a half or two times the required scale of the reproduction. The title and figure number can be set up in type after the block is made and a small block can be inset into the text. Annotations can be made by inserting type into the actual block, but it is greatly preferable to have the original carry all annotations on it. The block once made can remain in the customer's hands and be set up again with different type ; alterations to line blocks are expensive and would only be carried out on large blocks.

HALF-TONE BLOCKS.—The difficulty of reproducing a facsimile of a photograph by a machine which uses only black ink and white paper without intermediate shades of grey is met by photographing the original on to a sensitised metal plate (usually copper), a transparent screen ruled with very fine squares being placed in front of the metal plate. In this way the whites are reproduced as very pale grey (due to the pattern of the ruled lines); the greys are reproduced as tiny black dots whose size varies with the depth of the grey, whilst the blacks are reproduced by black dots the full size of the squares; in effect a solid black. The pale grey representing white is often made to print as white by the block-maker removing the very fine dots formed by the ruled screen. It will be seen that a half-tone is really a black and white stipple of finely-spaced black dots whose size varies with the depth of tone, which gives a perfectly graded reproduction of a photograph when viewed from the usual reading distance. The excellence of the gradations depends upon the fineness of the ruled screen, but a fine-screen block demands a more highly-glazed paper for printing on than a coarse-screen one. Beyond the question of retouching (briefly dealt with later) and the warning that the original should generally be larger than the reproduction, there is very little to say as to the kind of original to supply to the block-maker. Glossy prints of a rather contrasty nature are ideal for reproduction.

ANALYSIS OF APPLICATION OF REPRODUCTION METHODS TO ORIGINALS OF VARIOUS SIZES AND KINDS.

It is important for the author or editor of a report to be in a position to decide, when originals are handed to him already prepared, what methods of reproduction it is possible to employ, so that the questions of cost and number of copies, etc., can be considered. Conversely, it is equally important to know what type of original should be prepared to be suitable for a given method of reproduction.

The matter is very complex on account of the number of factors involved and their possible combinations. An attempt is made in the following tables to present this information in a concise form. It must be borne in mind, however, that to a combination of a skilled artist, photographer, and printer, with full equipment, any original can be reproduced in any way. The methods employed would necessarily be so indirect and costly that they would only be used in very exceptional circumstances. The tables given have the merit of being entirely practical.

KIND OF ORIGINAL.

- Line or half-tone.
- Same size or larger (than the reproduction).
- Transparent or opaque.

METHODS OF REPRODUCTION.

- Class A. Blue print; dyeline; ferro-gallic; sepia; ozalid.
- Class B. True-to-scale.
- Class C. Photostat and similar.

Class D. Photo-litho and similar (including Rota-print).
 Class E. Process blocks (line and half-tone).

TABLE I.
 POSSIBLE DIRECT METHODS OF REPRODUCTION.

<i>Original.</i>	<i>Reproduction Methods.</i>
Line—same size—transparent . . .	A B C D E
Line—larger—transparent . . .	C D E
Line—same size—opaque . . .	C D E
Line—larger—opaque . . .	C D E
Half-tone—same size—transparent . . .	A (1) C D (2) E
Half-tone—larger—transparent . . .	C D (2) E
Half-tone—same size—opaque . . .	C D (2) E
Half-tone—larger—opaque . . .	C D (2) E

TABLE II.
 POSSIBLE METHODS OF REPRODUCTION USING A REDUCED OR
 SAME SIZE GLASS OR PAPER NEGATIVE AS INTERMEDIATE PROCESS.

<i>Original.</i>	<i>Reproduction Methods.</i>
Line—same size—transparent . . .	See note (3)
Line—larger—transparent . . .	A B C D E
Line—same size—opaque . . .	A B C D E
Line—larger—opaque . . .	A B C D E
Half-tone—same size—transparent . . .	A C D (2) E
Half-tone—larger—transparent . . .	A C D (2) E
Half-tone—same size—opaque . . .	A C D (2) E
Half-tone—larger—opaque . . .	A C D (2) E

- (1) This has to be qualified as follows : Prints will be “opposed” (in the positive-negative sense) to original for blue print and sepia. Prints will be “reversed” (left to right) unless originals are of negligible thickness.
- (2) Photo-litho would not generally be chosen for half-tones unless the office reproducing equipment for text and illustrations were based on photo-litho process.
- (3) No advantage gained in using intermediate process.

GENERAL INFORMATION.

ORIGINALS.

It is of prime importance to realise that the appearance and appeal of any reproduced illustration depend equally upon the quality of the original and the skill and care paid to the reproduction process. No method of reproduction will produce a good illustration from

a careless or slipshod original drawing, but poor reproduction will spoil the effect of a good original. As a rule too little attention is paid to such matters as lettering, spacing of lines, and general finish of the drawing or diagram. An engineering draughtsman is concerned chiefly with the technical side of the work. His point of view is that so long as the drawing carries the necessary information legibly and accurately no more can be asked. This attitude is not the right one towards drawings which have to be reproduced in quantity. In this work it is essential to choose draughtsmen who can give a professional appearance to the illustrations.

LETTERING.

This feature often makes or mars an illustration. The wording should always be large enough to be clear when reduced for reproduction. The Econasign system (The Econasign Co., Ltd., 137, Victoria Street, S.W.1) uses thin transparent stencils for adding lettering to diagrams. The Wrico system (Messrs. Cook, Troughton and Simms, Ltd., 15-17, Broadway, Westminster, S.W.1) uses stylo pens in conjunction with transparent guides. Both are useful aids to good lettering. The title should always be close up to the diagram; this is particularly important where a number of diagrams and sketches are placed vertically on one page.

SIZE OF ORIGINALS.

Unless for reproduction by direct contact, all originals should be drawn larger than the reproduction, as reduction has a refining influence. Originals should never be enlarged in reproduction; it is preferable to make a new larger original by copying and to retouch the larger original. The proportions of an original can never be varied, of course, by any reproduction method.

TITLE AND FIGURE NUMBER.

These should always be included on the original; the only exception is in the case of originals for process blocks.

RETOUCHING FOR REPRODUCTION.

Where the expense is justified a poor photograph can be retouched by hand to give a brilliant result; parts can be blocked out or "misted over" (*i.e.*, ghost effects). This is useful in certain machine and technical illustrations. Block-makers often undertake retouching, which is carried out with an air brush, ruling pen, water colour black and white paints and small sable brushes. This work is not, of course, the same as negative retouching as carried out by portrait photographers. For non-pictorial half-tone illustrations it is quite a common practice to "block-out" the background. This procedure is usually carried out on the film side of the glass negative by painting over everything outside the outline of the object with an opaque water-colour paint; "Photopake" is commonly used.

MARKING ORIGINALS FOR THE BLOCK-MAKER.

The original should have sufficient room at the foot for written instructions, or should have a strip of paper pasted on for this purpose. One dimension, usually the width, should be marked in blue pencil

and the kind of process clearly indicated (*i.e.*, line block, photo-litho, etc.). Light blue pencil marks can be used on the original, if unavoidable, but never ink or black, red, or orange marks.

MOUNTING PHOTOGRAPHS.

Small photographs mounted on a text page are rarely successful; it is preferable to use the masking method. The dry mounting process (shellac tissue) is greatly superior to any other method of mounting photographs for retouching or other purposes.

USE OF MASKS.

A negative smaller than the text page can successfully be used as a full page illustration by masking the border during contact printing. The title and figure numbers can be added by using two separate exposures with the title space masked in the first and all else masked in the second exposure. For any considerable number of prints, however, it is preferable to make a new negative carrying the picture and title, etc.

COLOUR WORK.

Coloured originals—*i.e.*, water colour or oil paintings, etc.—to be printed in one colour can be treated as ordinary half-tone originals by merely photographing the picture on to a panchromatic process plate, using appropriate light filters with the camera lens to prevent the different colours giving a wrong depth of grey in the negative. Reproducing coloured half-tones in full colour is a special branch of work that would not be attempted except by important printing firms. Line drawings can easily be reproduced in any desired colour by the photo-litho or process block method; the usual black ink is merely substituted by one of the desired colour. Line originals should never be prepared in any colour but black, irrespective of the colour in which they are to be reproduced.

NEGATIVES.

This term is used throughout in the sense that the original or print so described is the exact opposite with regard to lights and darks of either nature (in the case of originals) or of the original (in the case of prints). The reversal of left and right with lettering reading backwards, which would otherwise always accompany any process which gives negatives from positives, is avoided in contact printing by placing the original with the effective side away from the sensitised paper. This is only practicable with thin originals such as those on tracing cloth, translucent paper, or celluloid films. In other combinations of processes the reversal could be corrected by using one further stage of copying or contact printing, but combinations giving such reversals are best avoided altogether.

A suggested Economical Universal Reproduction Outfit capable of dealing with up to, say, 200 copies of any type of illustration.

It will be realised that no single process can cover all the very varied requirements of illustration reproduction with due economy;

each process and type of equipment covers its own special field, although there is, of course, a good deal of overlapping. It may be of assistance to outline a choice of methods and equipment that will enable a business house already possessing a rotary duplicator of the stencil type to reproduce illustrations suitable to bind into a bulletin of, say, quarto size. It is assumed that ordinary blue printing equipment is also available. These conditions are selected as being fairly common.

The method selected here as being economical and most generally satisfactory, as well as æsthetically pleasing, is the sepia print system used in conjunction with an ordinary copying camera and photographic enlarger. The method of dealing with the various types of illustration is given below.

(1) FOR LINE DIAGRAMS.

Prepare the original on tracing cloth the same size as the bulletin page. Title, figure number, and, if desired, page number should be lettered on the original and sufficient margin left for binding. Use contact prints as bound-in pages. The prints will be negatives; if positives are required prepare one negative print on sepia negative paper and take contact prints from this negative.

(2) FOR PHOTOGRAPHS AND OTHER HALF-TONES.

The object to be illustrated is first photographed on to a whole plate. Use the resulting negative, suitably masked, for direct contact printing on to sepia paper. If title and figure number are required, the first negative should be enlarged on to photographic bromide paper and the lettering carried out on the enlargement, great care being taken to allow for subsequent reduction in size of the lettering. The enlargement is then copied on to whole plate size in the camera and the resulting negative used for producing sepia contact prints.

(3) FOR LARGE ORIGINALS WHETHER TRANSPARENT OR OPAQUE.

The original is copied in the camera on to a whole plate (preferably a process plate). If the original is a tracing it will be necessary to hold the tracing cloth as closely in contact as possible with a sheet of white card. The pale blue tint of the tracing cloth will then photograph almost pure white. If the original is a blue print the matter is more difficult. It would be necessary to "over correct" for the blue colour by using a deep red filter with the camera lens. A panchromatic plate—preferably but not necessarily a process plate—will be essential. Use the negative for sepia contact printing. Re-copy after lettering on an enlargement if title and figure number are required.

The Technical News Bulletin and the House Journal of the Metropolitan-Vickers Electrical Company.

By MISS B. M. DENT.

The Technical News Bulletin issued by the Intelligence Section of the Research Department of the Metropolitan-Vickers Electrical Company was started some seven years ago to satisfy a need felt by the overseas offices. These offices frequently had difficulty and always delay in obtaining the standard literature and asked the Research Department if it would be possible to distribute to them week by week a carefully selected summary or index of any technical articles of importance.

At that time all the journals taken by the Library were scrutinised on arrival—where possible by men directly interested in their subject matter—and short abstracts (or scrutiny-slips) were circulated to the various people likely to be interested. It was a fairly simple matter to collect these abstracts into a weekly Bulletin, and to add to them abstracts of any articles of particular interest to the overseas offices. In this form the first few issues of the Technical News Bulletin were distributed, and shortly afterwards the mailing list was extended to include all internal sales departments and the district offices in the United Kingdom. Naturally its scope was determined by the needs of the recipients and it did not attempt to do more than bring to their notice the more appropriate articles in what might be called the general engineering press, including articles of economic and statistical interest. Later the Bulletin was offered to the engineers at the works with the result that the circulation grew rapidly. At the request of the design engineers more highly technical abstracts were included. At present 110 copies are distributed, mainly among our engineers at home and abroad, members of the Research Department, and of the Sales Departments, but copies are also sent to our associated companies and to a few university friends, and others. A copy is sent to the Science Library.

The essential requirement in this particular case is promptness of publication. No large firm today can afford any delay in gleaning all the available information on developments in its own and allied fields. The engineers themselves, who have very limited time for reading, cannot hope to keep up with the spate of published literature and it is safe to say that one really prompt abstract may be worth twenty which are two months old. Weekly journals are abstracted within a day or two of receipt and the longest period which elapses between the issue of a weekly journal and the issue of the bulletin containing abstracts from it is eight days. Monthly journals are abstracted during the same week that they are received. It is not always possible to be so quick with journals arriving from abroad owing to the time lost in transit, but every effort is made to abstract them as soon as possible after receipt.

At present the number of journals scrutinised is 160, of which about twenty are in foreign languages, and the number of abstracts

published each week averages about twenty. It must be stressed that the Bulletin does not purport to be in any way a complete bulletin of abstracts covering all the relevant press. Only those articles are abstracted which are likely to be of interest to the aforesaid recipients within our own organisation. The object of each abstract is to give a clear and accurate idea of the scope and important features of the article, so that the reader may judge whether it is worth his while to study it in its complete form. No attempt is made at criticism or at a reproduction of results. The number of words per abstract is about 100 and if the article contains illustrations, the number of them is stated. After the issue of the Bulletin each week a large number of requests come in to the Library for the supply of the articles in full, and we frequently withdraw journals from circulation for the time being to satisfy these requests. The abstracts of articles in foreign languages lead in many cases to requests for translation of the complete articles.

It was thought desirable to present the Bulletin in such a way that it could be used by its recipients as a bibliography on those subjects in which they are most interested. The matter is therefore arranged so that it can be cut up and pasted on standard six inch by four inch cards and filed. The recipient can thus retain those abstracts of interest to him and discard the rest, so that his file is less bulky and more select than it would be if he kept complete copies of each Bulletin. Quarto paper is used, two abstracts being placed on a page to allow for easy clipping. A subject index is provided each week, and the cover sheet contains a list of journals, with dates, from which the abstracts appearing in that particular issue have been made. For convenience in circulation, one or two pages containing a list of the recent additions to the Library are added at the end. Since the circulation is so small (110), reproduction is done by means of typed stencils and a Roneo machine. No diagrams or illustrations are included. The title of the article and author are typed at the top left-hand corner and underlined, the classification number appearing immediately underneath. At the top right-hand corner appear the serial number of the abstract and the reference (abbreviated title, date and pages).

Three different methods of preparation of the abstracts are possible, and we have tried them all at different times. Various members of the Research Department Staff may be allotted certain journals and requested to make abstracts from any articles of interest appearing in them. So far as possible the abstractor for any particular journal is chosen for his knowledge of and interest in the field it covers. For some years we arranged for a college apprentice to scrutinise the journals and make the abstracts under the close supervision of the editor. At other times the editor himself has been responsible for abstracting all the journals in the English language. The foreign journals are scrutinised and abstracted by the Research Department translators, and in this connection it should be stressed that it is not sufficient for them to be good linguists, they must also be thoroughly conversant with the subject matter of the articles.

In all these cases it is essential that the editor, who is responsible for supervising the selection of articles to be abstracted as well as for carefully editing the abstracts themselves, should be in close touch with the needs and interests of the engineering departments and should

have a flair for this kind of work. Of these methods the last two at any rate may be made to work successfully given the right man as editor and the choice is a matter of policy dependent on the internal organisation of the department.

Since the beginning of the year the abstracts have been classified on the C.D.U. system, and the subject index issued with each week's issue is arranged in the order of the appropriate decimal numbers. All the abstracts published in the Bulletin are cut up and filed in subject order by the Intelligence Section, and this file serves as one source of information when a literature search on any particular subject has to be made.

The House Journal of the Company is not issued by the Research Department, but by the Publicity Department, and only a brief mention of its main features will be made here.

It is a purely technical journal issued monthly for the purpose of informing our chief customers of the developments made by the Company from time to time, and also of the more important installations or pieces of plant manufactured.

The contributions are written by the Engineering Staff in the Works and have to receive the sanction of the head of the department before publication, the general editing being done by the Publicity Department. The matter is sent to the printers on the 20th of each month and six weeks is allowed for the completion of printing, thus, matter for the August number of the Gazette is sent to the printers on the 20th June. The printers supply both galleys and page-proofs, and while it seems rather a long period of time for printing, it is our experience that the printers can and do supply a much better finished publication when they are not pressed for time.

The paper used is a good glossy imitation art, and the illustrations are fine-screen half-tone blocks made from photographs taken for the most part by the Publicity Department.

The Bulletin of the British Non-Ferrous Metals Research Association.

By B. FULLMAN, B.Sc., A.I.C.

In presenting these notes the writer is anxious to avoid any appearance of generalisation. The methods which will be described have been evolved from experience, solely on account of such considerations as speed, economy and suitability to the users of the B.N.F.M.R.A. Bulletin. In other organisations, totally different methods may be found more suitable. In general, the superiority of one form of working over another does not arise. The real point at issue is that each case should be treated on its merits, and in relation to the people whom it is designed to serve.

The Bulletin of the British Non-Ferrous Metals Research Association is among the most important features of the service provided by the Association's Information Department. The Bulletin circulates among the members of the Association, who comprise most of the important producers, manufacturers, and fabricators of non-ferrous metals in Great Britain and the Empire. The readers, who are various officers of these firms, differ very much in outlook, their interests ranging from pure metallurgy to the workaday applications of non-ferrous metals. In the evolution of the Bulletin to its present form, a great influence has been exercised by the fact that the very varying interests of the numerous members have been kept constantly in mind.

The Bulletin now appears monthly, except that no issue is made in August. Since this is the most popular period for holidays, it is felt that better results are obtained by issuing a slightly enlarged number to cover August-September than by issuing two numbers separately. Hitherto the Bulletin has been timed to appear at the end of the month, but recently, on grounds of convenience, a change has been made in this respect, and in future it will appear in the first days of the month of issue. The contents of the Bulletin (which normally runs to a maximum of thirty-two pages) consist in general of three well-defined sections: (1) Association News; (2) Advances in Non-Ferrous Metals Research and Industry; and (3) A section dealing with the Association's own publications (research reports, etc.), reviews of books, and new accessions to the Library. For the present purpose, attention will be focussed almost entirely on the "Advances" section. This forms much the largest part of the Bulletin, and consists of a series of short notes on the most important publications (papers, articles, pamphlets, etc.), which have appeared since the previous issue. The bulk of the material dealt with has usually appeared in a period ranging from about a fortnight to about six weeks before the date of issue of the Bulletin.

The notes which appear in the "Advances" section originate in the editor's survey of the journals, pamphlets, preprints, etc., which have appeared. Nearly 200 journals are received in the B.N.F.M.R.A. library, while many others are regularly inspected in the Patent Office

Library. The list of journals searched has been carefully selected from those appearing in English and other languages as being likely to contain matter coming within the field of interests of the Association and its members. As each journal or other publication is searched, each paper or article of importance is rapidly examined, and a short note on its salient points prepared. When the entire range of publications has been covered, the notes are reviewed as a whole. Necessary corrections are made; matters of doubtful importance are deleted; and points of technical difficulty are smoothed out by discussion with other members of the staff. The manuscript is then ready for reproduction.

It will be observed that the word "notes" is used, and not "abstracts". The object of the notes is to draw attention to the more important points as briefly and with as little delay as possible. From experience, and a knowledge of the members' interests, it is possible to convey all the necessary information in a very few words. An ordinary abstractor is dealing with a large and heterogeneous public, whose individual interests he cannot possibly know. Moreover, it is his duty to give a faithful picture of each paper as a whole. In the present case, the object of the Association is often far better served by drawing attention to one or two conspicuous points in it. The B.N.F.M.R.A. Bulletin does not therefore either compete with or overlap the ordinary abstracting journals. This is especially marked by the fact that it is not thought necessary to note every paper published. From reasons of economy, resources of space are limited. The Bulletin therefore deals only with matters of present or potential importance to members. This is kept in mind during the actual preparation of the notes, matters of minor importance being ignored; and also, as indicated above, in the final checking-up, in which notes of small importance are weeded out.

A number of the journals surveyed are, of course, regularly read by various members of the technical staff of the Association. By arrangement with the editor, some of these readers draw his attention to matters which in their opinion are worthy of notice, each reader making himself responsible for one or more journals. This obviates the necessity of a complete survey of the journal in question by the editor himself, a saving of time which is sometimes further increased by the preparation by the reader of a note suitable for the Bulletin.

The B.N.F.M.R.A. Bulletin is printed, although there is much to be said for other means of reproduction. At the best of times, however, a series of technical notes can be rather repellent even to the eye of a specialist: and as the object in view is to persuade readers to take the greatest possible interest in the literature, it is thought advisable to present the notes in an attractive form. A good deal of thought has been devoted to choice of suitable types and lay-out.

In order to produce a printed Bulletin for issue at the end of each month a schedule somewhat as follows is aimed at: The manuscript should be in the hands of the printer by about the 17th of the month. Galley proofs are sent by the printer on about the 23rd, and returned corrected next day. (Incidentally a few late notes can be inserted at this stage.) Page proofs arrive on about the 27th, are returned to the printer on the 28th, and the complete journal is received on the 29th or 30th. It is of great importance to co-operate with the printer

by keeping as close to the programme as possible, and by prompt return of corrected proofs.

The preparation of the Bulletin is carried out simultaneously with other activities which arise out of the survey of published literature. In some cases, information noted may be of such importance to some member of the Association that it is advisable to let him know of it before he can see it later in the ordinary way in the Bulletin. Still another offshoot of the survey is the requisition of literature just published or announced for future publication. Programmes of meetings, titles of papers already read or to be read, announcements of trade publications, etc., are scrutinised carefully, and advance copies, reprints and so on obtained as soon as possible. This entails a very considerable amount of correspondence, but the work involved is more than repaid by the results. By this means it is frequently possible to obtain papers which in the ordinary course of events might not become available until months later. Such papers are, of course, among the material surveyed for the Bulletin, and add considerably to its value. The possession of preprints and reprints is also of great importance in the economical operation of the library.

Information Bulletins and House Journal

OF

The Mond Nickel Company, Limited

By E. W. PARKER

The Information Bulletins of The Mond Nickel Company fall into three classes, viz. :

- (1) The Weekly Staff Information Bulletin. (General Reference Sheet.)
- (2) The Monthly Nickel Bulletin.
- (3) Technical Publications.

I. THE STAFF INFORMATION BULLETIN (GENERAL REFERENCE SHEET)

In view of material contributed to the Symposium held in 1932, it is unnecessary to deal at length with this aspect of the information service. Remarks under this heading will therefore be confined to a recapitulatory outline of the system which has been successfully adopted during the past seven years as a means of dissemination of published information to internal staff.

The *General Reference Sheet*, which is sent out in mimeographed form, contains reference to published technical and patent material which has become available during the period Monday—Saturday of any one week and is mailed on the following Tuesday.

The information embodied in it is obtained by means of a comprehensive survey of the current technical press and patent literature, the bulk of the searching work being carried out in the Patent Office library and the libraries of scientific institutions.

Every issue of some 240 journals is now regularly searched and "outlier" publications are touched by means of abstract journals (Chemical Abstracts, British Chemical Abstracts "A" and "B" *Chemisches Zentralblatt*, etc.). Patent literature is covered by systematic consultation of all original specifications in the United Kingdom, France, Germany, and the United States. The journals issued by the Patent Offices of Canada and South Africa are also regularly inspected.

The Sheets are distributed to all departments of the Mond Nickel Company Office, to all associated Companies in England, to the Continental offices (Paris, Frankfurt, Brussels, and Milan), to our associated Company in Canada and New York, and to the Japan Nickel Information Bureau in Tokyo.

The Sheets are issued with the primary object of providing immediate notification of all literature bearing on the Company's interests. They therefore include reference to articles of general, as well as purely nickel, interest. The form of reference comprises brief details

of the location and scope of the original publications, the entries being sufficiently informative to enable recipients of the G.R. Sheet to make selection of material relating to their individual interests. Originals, translations or abstracts of such articles may then be requisitioned from the Technical Information Section.

The success of this method of disseminating information has been very amply demonstrated and has the advantage of giving all readers a bird's eye view of the general trend of publication, in addition to bringing to the notice of each individual specific items in which he is interested.

Preparation of annotated bibliographies, both technical and patent, also ranks as information service which is in regular and constant operation, but the detailed discussion of this and certain other forms of technical information work hardly comes within the scope of the present subject.

II. THE NICKEL BULLETIN

In passing to the consideration of the second branch of our information service, the *Nickel Bulletin*, I should like to emphasise the essential advantage of systematic utilisation of "internal" material (material prepared initially for circulation to staff) in the preparation of "external" (published) bulletins. The abstract section of the *Nickel Bulletin* is based on the nickel items reported on the General Reference Sheets for the appropriate period, and the same material is utilised in the kindred section of the *Nickel Berichte* and in the bibliographical sections of the *Revue du Nickel* and the *Japan Nickel Review*.

The *Nickel Bulletin*, which can perhaps be more correctly described as a technical information bulletin than as a house journal, owed its inception, in 1928, to the very obvious need for a centralised source of information on the constantly increasing literature of nickel. The Bulletin represented what was at that time considered to be a somewhat new departure in house journals, in that it was designed to function not merely as a propaganda medium for nickel, but as an up-to-date bibliographical record of all outstanding publications relating to this metal. (The practical value of the time factor as an aid in research and development is too well known to require lengthy discussion here. In this respect the rapid-survey house journal is to some extent a complement to the older-established type of journal in which fuller abstracts appear after a longer time lapse.)

The *form* of the Bulletin has from time to time undergone some minor changes, made with a view to increasing its usefulness in different spheres. The earliest volumes contained abstracts of current literature, together with one leading article of a technical character. Subsequent developments have indicated the advisability of including other brief articles, and of the addition of illustrations, while a still more recent modification has been the issue of the main article in separate form, as a unit in the Technical Publication series (see III. below). A further change, from single-wide to double-narrow columns of type, was adopted some years ago in order to give greater flexibility of make-up. This is an important consideration in the case of an illustrated abstract journal whose total bulk of material must necessarily be uncertain and irregular.

In connection with the *preparation* of the Bulletin the following facts may be of interest :

1. Organisation of the lay-out, programme of articles, printing, and mailing, are in the hands of the publication department, the Bureau of Information on Nickel, which works in closest co-operation with the Research and Development Department.

2. Main articles (now issued separately as Technical Publications) are prepared as shown under III. below.

3. Short articles, which are of a strictly practical character, are prepared in collaboration with the technical staff of other firms who may have experience in the use of nickel-containing products.

4. Preparation of the technical abstract and patent sections is carried out by the library staff, in collaboration with the research and development staff. The material to be included in the Bulletin is selected from the General Reference Sheets, the abstracts for the Bulletin being (a) prepared *ad hoc*, or (b) condensed or elaborated from material already issued to staff.

Relative practical importance* in the abstracts section is indicated by the adoption of three different forms of set-up, viz. :

(a) "Abstract." A substantive title, broadly indicative of the scope of the contents, an abstract and a bibliographical reference to the original source, *e.g.* :

Physical Properties of Nickel Alloy Steels

"Damping Capacity" (alternatively defined by the author as "mechanical hysteresis" or "Crackless plasticity") has been studied in a series of steels including the following compositions :—(1) nickel 1.5, molybdenum 0.30, per cent. (2) nickel 2.96, chromium 0.97, per cent. Determinations were made of the influence of temperature, heat treatment, cold work and composition, and it was shown that a general correlation may be made between damping capacity and creep strength, but that the existence of a constant relationship between damping capacity and fatigue or impact values is doubtful.

G. K. BROPHY.—"Damping Capacity of Steels and Correlation with other Properties."

Iron Age, Nov. 24, 1932, pp. 800-2.

(b) "Major Reference." A substantive title as used in (a), with a bibliographical reference to the original and a brief note on the contents, *e.g.* :

Resistance of Nickel Alloy Steels to Scaling

C. UPTHEGROVE. — "Scaling at Heat-Treating Temperatures." *Metal Progress*, June, 1933, pp. 30-33 and 62.

(Discussion of the effect of atmosphere produced by burning city gas with different air ratios. Includes data on nickel alloy steels at 1700° and 2300° F. (930° and 1250° C.)).

* See further notes on abstract section at † p. 65.

(c) "Minor Reference." Bibliographical details of the original, with brief note, if required, in amplification of the title, *e.g.* :

"Experiments on Artificial Ripening of Spirits." Z. de SANDOR.
Chemical Abstracts, May 10, 1932, p. 2550 (from *Mezogazdasági Kutatások*, 1931, vol. 4, pp. 468-481).
(Satisfactory results obtained with nickel catalysts.)

It may be noted that we have advisedly adopted for the Bulletin a more popular form of reference than that employed for more specialised bibliographical work. For purely library purposes we use approved abbreviations, followed by year, volume, and page number, *viz.* : *Compt. rend.*, 1933, cxci, 2-5, but it was believed that this form might be too specialised to meet the requirements of certain readers of the Bulletin who might not be already familiar with technical literature.

(See also additional notes on abstract section at † below.)

5. Draft material is forwarded to the printer at intervals during the latter half of the month (proof is dealt with in corresponding batches) and closure is on the 2nd or 3rd of the following month, with inclusion of abstracts of all material available during the previous calendar month. Only in the case of months showing excessively heavy publication is material held over until the next issue.

6. Publication takes place on or about the 15th of each month.

7. Envelopes are addressed on a machine (Adrema) on which the operator has attained a working speed of 2,000 envelopes per hour. Time expended in despatch, including addressing and insertion of material in envelopes, is two and a half hours per 1,000. Printed-paper-rate envelopes of a tabbed type are used and are stamped (without charge) at Somerset House.

8. The mailing list, which is kept under strict revision, is divided into sections relating to the different fields of interest covered by nickel-containing materials. Upkeep of the mailing list is materially assisted by the "please return if undelivered" legend appearing on the left-hand top corner of the envelopes.

As supplementary to the working details of the preparation of the Bulletin, the following notes may be of interest :

†(i) The *abstract section* is designed to be "A Summary of Recent Information on Nickel" and as such is compiled essentially from the standpoint of users and makers of nickel-bearing products. The fact that the *Nickel Bulletin* has proved to be a most fruitful means of stimulating interest in actual and potential uses of nickel is believed to be due in no small measure to the rigid exclusion of any unduly propagandist note and to the establishment of a reputation for fair and honest statement with regard to the limitations, as well as the advantages, of the metal in which we are primarily interested.

(ii) As a sidelight illustrating public appreciation of up-to-date information service, it may be worth while to refer to the *circulation* history of the *Nickel Bulletin*.

Starting with a mailing list of some 3,000 obtained from field contacts, etc., a certain amount of initial introductory work was done. After a comparatively short period, however, the unprompted demand

became so heavy that publicity activities were suspended. In spite of this cessation, the clientèle has consistently increased, with the result that the circulation now stands at something over 19,000.* In view of the fact that systematic and rigorous weeding of mailing lists is regularly carried out, it will be appreciated that this circulation represents vital and active interest only. A marked feature of the "request" mailing list is its catholicity; it ranges from the "pure research" worker to the "man at the wheel," and is used, we have reason to believe, with equal advantage in the university and the foundry.

III. TECHNICAL PUBLICATIONS.

The third section of the Information Bulletins of The Mond Nickel Company comprises a series of technical publications, issued separately and in conjunction with the *Nickel Bulletin*. These publications, prepared by specialists in the respective subjects, consists of up-to-date summaries of existing knowledge within the various fields. They are based on the results of original research, on information of a non-confidential character obtained during field visits, on published literature and on service experience.

Titles of a few representative *Technical Publications* are given below :

- "THE MECHANICAL PROPERTIES OF NICKEL ALLOY STEELS."
Publ. B. 15.
- "NICKEL CAST IRON 'TO-DAY.'"
Publ. A. 11.
- "THE LIGHT ALUMINIUM ALLOYS CONTAINING NICKEL.
SUMMARY OF THEIR PRESENT POSITION IN ENGINEERING
PRACTICE."
Publ. D. 6.
- "AMERICAN AND CONTINENTAL PRACTICE IN NICKEL DEPOSITION."
Publ. L. 4.
- "THE PHYSICAL PROPERTIES OF NICKEL-IRON AND SOME
RELATED ALLOYS."
Publ. O. 2.
- "THE NICKEL-COPPER ALLOYS CONTAINING MORE THAN
50 PER CENT. NICKEL."
Publ. R. 2.

The forms and methods described in the foregoing paper do not lay claim to any undue originality or excellence, but are offered as service experience of working systems which have been attended with a degree of success. The policy of the Company in its publication work is dictated by a strong conviction of the usefulness of a reliable information service as an aid to establishing closer liaison between research and practice and as a means of promoting sound industrial development.

* A kindred publication issued by the Nickel Informationsburo, G.m.b.H., from their headquarters in Frankfurt a. M., has a circulation of upwards of 6,000.

Members' and Staff Bulletins of the British Cast Iron Research Association.

By M. PEARS, A.L.A.

The Quarterly Bulletin of the British Cast Iron Research Association has been issued to all members since 1923, and comparatively few changes in arrangement have been introduced during that time. This Bulletin is intended, broadly speaking, to provide news of the Association's activities, and to bring to the notice of members in all branches of the industry published matter which will be of interest to them. In addition one or more technical articles are usually included, or a review of recent literature on one particular subject which is receiving attention at the time. The Staff Bulletin or Information Circular, which is issued every week, is, on the other hand, a recent innovation and is still in the experimental stage. No claim is made for originality in this Information Circular, although, of course, it is planned and adapted to meet our own particular needs, to fit in with the plan of preparation of the Quarterly Bulletin, and with the work of recording information in the library. Much help was derived in working out this system from the papers read in the Symposium on the Establishment of Information Bureaux, and the discussion which followed, at the ASLIB Conference last year. The purpose of the weekly Circular is to keep members of the staff of the Association in touch with current literature, and to inform them of the additions to the stock of the library so that they may consult new matter at once if they wish to do so. The planning and preparation of the Staff Bulletin will be described first since it provides a means of collecting material for some sections of the Members' Bulletin.

The Information Circular, which is sent round to all members of the staff on Monday of each week, is made up of two parts. The first section contains a list of references to all articles which have appeared in the periodicals received in the library during the week, likely to be of interest to any member of the staff or worthy to be included in the library catalogue. The list of titles is divided into the same eight sections as the abstracts which appear in the Quarterly Bulletin, but no abstracts are given. If the title is very general, but the paper contains one part dealing with some subject of current interest, a short note is added to the title. The method of collection of titles is simple. The page number of the article to be listed is noted on the circulation slip pasted on the front of each periodical as soon as it is received, a further slip giving the author, title and full reference is typed, numbered and filed behind the appropriate card, and the slips are arranged alphabetically in each section at the end of the week, the stencil for duplicating being made by the office staff straight from the slips. The second part of the weekly Circular contains the additions to the library, which appear under the headings Books, Periodicals, Reports and Pamphlets, and Patent Specifications. As the number is comparatively small, the slips are typed straight from

the Accessions Book, arranged in alphabetical order, and the stencil made as for the first section.

The Information Circular was originally issued on Friday, but as most of the weekly periodicals are received on Friday and Saturday, it was thought that the information would be more up-to-the-minute if the day of issue were changed to Monday to allow articles in the papers received on Saturday to be included. The stencils are made on Monday morning, checked, duplicated on a Gestetner machine and the lists are made up with a cover page on which appears the date and number of the issue, being completed ready for circulation on Monday afternoon. The number of pages varies from three to six, of quarto size (8in. by 10½in.), and each copy is stapled at the side and punched to allow for filing. Three copies are kept in the library, two for filing and one for cutting up.

The Members' Bulletin which appears in January, April, July and October, has a circulation of about five hundred and fifty, which includes all members both in this country and abroad, certain libraries and institutions, and exchanges with other bodies for their publications. The first volume consisted of twenty issues, in which various experiments in pagination were made, and the index covered the twenty issues. There are now twelve issues to a volume, the pagination is continuous throughout and the index appears shortly after the completion of the volume. It is printed on double royal fifty pound printing paper, of royal octavo size, and covers as a rule about twenty-four pages. The average cost of printing is between £18 and £20.

Certain features appear regularly in each Quarterly Bulletin. The front cover bears the number of volume and issue and the date, the crest and title of the Association, and the address of the Headquarters. The inside covers bear the names of the Council and chief officers of the Association, and the last page is used for advertising either the apparatus or publications of the Association. These pages, together with the list of new members, are supplied corrected up to date by the office. The news of Council and Committee activities and the list of reports issued also appear in each Bulletin. There are generally several books to be reviewed, these reviews being prepared by the member of the staff most expert in the field covered by each book.

The list of additions to the library appears under the heading Books, Periodicals, Reports and Pamphlets, Trade Literature and Patent Specifications. To collect these entries the sheet headed Additions to the Library is taken from the copies of the weekly Circular issued during the last three months, cut into slips, arranged alphabetically, selected, and the list for printing is typed straight from the slips. This list is valuable for keeping members informed of new material available for loan, thus taking the place of a printed catalogue of the stock, such catalogues having been found of little use for our particular library. Most of the pamphlets thus listed are sent in to the library, and all papers of trade or technical character, strictly within the scope of our subject, which are noted in the periodicals received, are obtained.

The last section of the Quarterly Bulletin contains abstracts from foundry literature, that is from periodicals received in the library during the three months preceding the issue of the Bulletin, and

includes abstracts of appropriate Patent Specifications. As the abstracting, and in fact the preparation and editing of the whole Bulletin, cannot be allotted to one person, no attempt can be made to abstract periodicals taken by other libraries, although the large majority of periodicals required are taken by our own library and total about eighty-six in number. The abstracting system is considered not wholly satisfactory, and as soon as an opportunity arises, a more efficient abstracting service will be provided. The abstracts are classified under the eight headings which are also maintained in the Information Circular. All the articles which are listed weekly are not selected for abstracting, but if they are worth inclusion in the library catalogue, cards are made for them, or if, as often happens, a paper appears in several different places and at different times, the references are added to the original card. The method of checking to ensure the inclusion of all papers in the catalogue is perhaps outside the scope of this paper, except that it explains the arrangement of the weekly Circular, which might otherwise seem to waste space between entries. The weekly list is cut into slips and filed in alphabetical order under the eight headings, thus providing a kind of temporary three-monthly index. When the abstract section of the Bulletin is cut up to be pasted on cards for the library catalogue, the slips from the weekly Circular are checked with the cards and the articles which have not been abstracted are then recorded and the slips destroyed. The system may sound rather elaborate, but actually most of the work can be done by a junior, and it leaves little chance for error.

As was stated above, the abstracting system is simple. Titles only are given for articles which appear in periodicals which many of the members of the Association take for themselves, or are otherwise readily available, and longer abstracts are given for the less common ones, especially foreign, and of more important articles. No attempt is made to provide critical abstracts, but of course articles are treated from the point of view of those interested in our particular subject. Take for example, a general paper dealing with cylinder wear. Such a paper has an interest for many types of readers and one abstract could not make clear the points in the paper for each of the varied interests concerned. Thus our abstracts must be made from our point of view in order to stress such parts of general papers as will be valuable to our members. Full references are given after each abstract to the name of the periodical, number of volume and page, and the date. Abbreviations for the names of periodicals are not now used. An author index to abstracts appears at the end of the section.

Papers of permanent value to members, which have been presented to other bodies, are often circulated to them as Bureau Reports and technical articles in the Bulletin are, for convenience in indexing, also numbered and described as Bureau Reports, these being available for general circulation, whereas Research Reports are confidential to members only. An inset on art paper is usually made when illustrations are required in these articles as the paper on which the Bulletin is printed is unsuitable for reproductions. The only other matter included are short notices such as acknowledgements and the like, which are received at the last minute and are inserted in the proof where space allows.

All the material for printing having been collected and carefully checked, it is despatched to the printers about the 20th of the month preceding the date of issue. Seven galley proofs are required, four for circulation to the editorial committee, members of which receive for comment a galley of every printed report issued, and three for independent checking by the staff. The galley is read carefully with the originals for printer's errors, and these and all other corrections are incorporated in one proof from the other six copies, the arrangement of the matter indicated and, after a final check, the proof and original matter are returned to the printers. Two page proofs are sent in and are checked independently, the finished Bulletin being received about four or six days after the return of the corrected page proof.

The collection of the material for the Bulletin goes on continuously during two months, and the third month covers final selection of material by the Director, typing, printing and proof corrections and despatch. All typing and despatch work are done by the office staff, and collection of material, arrangement, editing and final proof correcting is done in the library.

A Technical House Journal with a Circulation of 15,000 copies a month.

By ERIC N. SIMONS.

The Edgar Allen News, which is the technical house journal of Edgar Allen & Co. Ltd., Imperial Steel Works, Sheffield, 9, was begun in July, 1919, on the suggestion of the late Mr. Thomas Russell, an advertising consultant of considerable experience and high integrity. It began as a bi-monthly publication of twenty pages, but it is now, and has been for some years, a monthly journal consisting of twenty-four pages.

In the beginning, the only advertisements were those of the publishers themselves, but within the last two years a limited number of outside advertisements from reputable firms have been accepted.

The circulation, in so far as its geographical distribution is concerned, is shown in Table 1.

The journal circulates almost entirely among actual or potential customers of the firm, covering practically every branch of engineering at home and abroad. A certain, but small, number go to technical institutions and colleges, and a few to private persons, most of whom pay a definite subscription.

The contents are mainly of a highly technical character, dealing with the products of the firm and their uses. Every attempt is made to maintain an editorial standard equivalent to that of a professional technical journal, and particular stress is laid upon the necessity of securing articles which are definitely of practical value to users of these products, whether supplied by Edgar Allen & Co. Ltd. or not. Anything in the nature of a mere blatant puff is ruthlessly eliminated. The technical staff of the firm contribute the majority of the technical articles, but occasionally, if an article of highly special character is required, outside contributors are sought, and reasonable remuneration is given.

As many of the readers of the Edgar Allen News are not themselves engineers, though they may fill important purchasing positions in engineering firms, each issue of the journal usually carries one article of historical character, based very often on original research, and giving the history of some product, process, or individual, of engineering or metallurgical importance. A few general articles, usually brief, dealing, for example, with the exposure of malpractices in the selling of steels, or with other subjects of general interest to buyers and users, are also included as opportunity offers.

The total circulation is 15,000 copies a month. The editors of the journal are Mr. R. G. Woodward, a director of the company, and the writer of this paper. Mr. Woodward in the journal's early years devoted a good deal of his time to the actual preparation of the journal, even to the extent of writing articles for its pages, but the increase of his directorial responsibilities during the last few years has necessarily caused him to give up some of this detail work, and he exercises at the

present time a mainly supervisory function. The bulk of the actual preparation of the journal is done in the Publicity Department, many of the articles supplied by the technical staff needing to be edited, amplified and illustrated in various ways, while, of course, all proofs have to be carefully read more than once. The journal is printed on quarto size ivory super-calendered paper, both half tone and line blocks being employed for illustrations. A second colour is not employed except for a few advertisements, and even this is shortly to be abandoned, as the increase in results has not been sufficient to warrant the additional expense. An inset card enables readers to write for other literature published by the firm.

Two important features of the journal are the "Problems Investigated" and "Notes from Overseas" columns. The first of these consists in a reproduction of problems connected with steel and steel products, put up to Edgar Allen & Co. Ltd. by readers and customers, with the solutions suggested by the firm. For example, it frequently happens that a customer desires specific information in regard to the suitability of a particular product for certain typical conditions. The information is given and the entire problem, with the answer, is inserted in the journal, without, of course, the mention of any names. The "Notes from Overseas" consist of abstracts from articles of metallurgical and engineering interest taken from foreign and American journals. These abstracts are prepared by the Information Service as a result of their perusal of numerous journals subscribed for by the company. Many of these abstracts are repeated in the Information Bulletin, which is sent out each month by the Information Service to members of the technical staff.

The primary object of the Edgar Allen News is to promote the business of the company and to create a feeling of goodwill between the firm and its customers. It can be said without hesitation that it is the best medium for this purpose of which the firm has experience, but it could not have achieved its object, in the opinion of the editors, if the policy behind its inception and continuance had been different. The Edgar Allen News has never been regarded primarily as an advertisement. It has been edited and looked upon as a technical journal proper, designed to be read, and intended to be of practical service. The Edgar Allen advertisements in the journal comprise two and a quarter pages out of twenty-four, which is not a very big proportion when compared with that of certain other house journals of a somewhat similar character. The words "we" and "our," often advantageous in advertisements proper, are carefully excluded from the text of any article in the News. If it is desired to refer in any way to the publishers, their name is given in full in the third person.

The cost of the journal works out at approximately 2½d. per copy, posted, exclusive of the revenue derived from advertisements. The News is folded and posted in a simple wrapper. The mailing list is kept on Addressograph stencil plates in steel cabinets, but the actual posting, folding and inserting in wrappers is carried out at the printing works where it is printed. The subscription charge to the journal is fixed at 5s. per annum. An index is prepared annually. This was at one time circulated to all readers, but, as only a small proportion of those who receive the journal actually retain the copies for reference, indexes are now only supplied to those who apply for them. A very

useful little binder is also obtainable on application, and this holds a year's copies.

TABLE I
MONTHLY CIRCULATION OF THE EDGAR ALLEN NEWS

British Isles	8,818
European Countries	1,280
South Africa	665
Africa, North and Central, including Rhodesia	306
India, Burma and Ceylon	285
China	118
Federated Malay States, including Straits Settlements and Dutch East Indies	116
New Zealand	632
Australia	509
Canada	644
U.S.A.	708
America, South, Central, and Mexico, including Argentine Chile, Bolivia, and Peru	514
Brazil	273
Japan	460
	15,328

NOTE.

During the symposium the chair was taken by MR. J. G. PEARCE. Following MR. J. C. S. STUART's paper, DR. S. C. BRADFORD, MAJOR G. B. ATHOE, MR. C. H. GRAY, and others discussed the comparative time taken by alphabetical and decimal systems to index entries for abstracts. After the papers by MR. G. T. CLARKSON and MR. N. PARLEY, there was an interesting discussion on methods of reproduction to which the following contributed: MR. S. W. GIBSON, MR. H. F. ALEXANDER, MISS H. B. ARMSTRONG, MR. B. C. CURLING, MR. G. P. INSH and MR. R. BRIGHTMAN. At the end of the symposium a brisk general discussion took place in which MR. J. C. S. STUART, MR. G. T. SPINKS, DR. S. C. BRADFORD, and others took part and to which the speakers replied. An account of the discussion can be seen by members on application to the office of the Association.

Efficiency with Economy in Chemical Abstracting.

By JAMES C. PHILIP.

In the circumstances of the past few years the Bureau of Chemical Abstracts has had perforce to scrutinise in detail the outlay on various branches of its activity and has been engaged in the effort to effect economies, while maintaining as far as possible the desired standard of efficiency in its abstracting service. Some account of the considerations which have been regarded as relevant to this problem and of the action taken in certain directions may be of interest to the conference.

It will be convenient to glance in the first place at the factors involved in the *preparation* of chemical abstracts. In this connection it is of the first importance that, as far as possible, the original journals shall be put into the hands of the abstractors, and it follows that all journals of the first rank in any particular field must be at the disposal of the abstracting organisation either by purchase or by loan. In such a wide field as that covered by chemistry the purchase of even the first-rank journals would be a serious charge, but the Bureau of Chemical Abstracts has here the advantage of its close association with the Chemical Society and the Society of Chemical Industry, the two largest bodies in this country concerned with chemical publication. As a result, the journals acquired by these Societies, either by purchase or exchange, more particularly for the purposes of the large Chemical Society Library, are put first at the disposal of the Bureau of Chemical Abstracts. The actual amount spent annually by the Bureau in the purchase of additional journals (including American patent specifications) does not exceed £120—a small fraction of the annual cost of British Chemical Abstracts. The advantages of close association between an abstracting organisation and a library are obvious.

So far, then, as access to journals of the first importance is concerned—and in these are included many others than those devoted exclusively to chemistry—the position in the chemical field is, I venture to think, satisfactory from the point of view both of efficiency and economy. When, however, the journals which are, chemically, of very secondary and occasional significance are considered, the problem of combining efficiency with economy is more difficult. Such publications may not be taken by the Library of the Chemical Society, and their purchase by the Bureau of Chemical Abstracts, for the sake of an occasional paper of chemical interest, might not be justifiable, especially in these times.

The difficulty may be met, with perhaps some sacrifice of efficiency, in one or two ways. Abstractors who are experts in a particular field may be entrusted with the duty of looking out for and abstracting papers which have appeared in relatively inaccessible journals, but which are deemed to have sufficient chemical interest. This procedure is more particularly suitable for dealing with papers in borderline fields, and should be adopted only where abstractors of experience and judgment are available.

The problem of the paper which appears in an out-of-the-way journal may also be met to some extent by co-operation between different abstracting organisations. The Bureau of Chemical Abstracts, for example, has a mutual arrangement with the American Chemical Society, in virtue of which any abstract published by the one organisation may be utilised by the other. Quite a number of papers traced in this way receive notice in the columns of British Chemical Abstracts.

The existing overlap and duplication in the *preparation* of chemical abstracts would appear, on the first consideration, to offer a promising field for economy. Apart from the fact that chemical papers are abstracted independently for the British and American organisations, a large number of papers receive notice in British Chemical Abstracts which are abstracted independently for the purposes of certain allied publications, such as the *Analyst*, *Journal of the Institute of Metals*, *Physiological Abstracts*, *Science Abstracts*, and *Nutrition Abstracts*. The suggestion that this duplication of effort and expense in the preparation of abstracts should be diminished by utilising *one* abstract of a given paper for various publications has frequently been considered by the Bureau of Chemical Abstracts, but the efforts to put it into practice have met with small success. It should, however, be pointed out that a promising experiment on these lines is now under trial, as between British Chemical Abstracts and Nutrition Abstracts.

The objections to the use of *one* abstract of a given paper in various publications arise mainly from the view that for each kind of scientific worker a special abstract of a paper on a border-line subject is required. Thus it is not considered feasible or desirable to provide the chemist and the physiologist with the same abstract of a paper on a biochemical subject: similarly with the chemist and the metallurgist. Personally, I consider that this view of the need for specific abstracts has been unduly stressed, and that more might have been done to secure economy on the lines suggested.

In general, it is clear that where abstracting organisations are already in existence, and have developed their own policy and procedure, it is difficult for them to depart from established practice and tradition, and to compromise in any way on the form and scope of abstracts. I would urge strongly, however, that when the initiation of new abstracts publications is contemplated, the most serious attention should be given to the possibility of collaboration with already existing agencies in the preparation of the abstracts.

In the effort to secure efficiency with economy in the preparation of abstracts, the question of the relative merits of whole-time and part-time sub-editors and abstractors has to be considered. While for the efficient running of a large abstracting organisation, and in order to secure the necessary continuity and uniformity, a certain amount of full-time service is required, there are notable advantages, in the chemical field at any rate, in distributing the abstracting and sub-editing work over a large number of part-time workers. The cost involved is probably not very different from that of a staff consisting of a small number of full-time abstractors and sub-editors, and, so far as the Bureau of Chemical Abstracts is concerned, the over-riding consideration has been that of the efficiency secured. By the appropriate allocation of the abstracting and sub-editing work to chemists whose experience and interest lie in particular parts of the scientific

field the adequacy and accuracy of the abstracts is maintained at a high level.

It may be of some interest to the members of the conference to set out the approximate costs incurred by the Bureau of Chemical Abstracts in connection with the preparation of the abstracts. They are as follows :

Editor (including clerical assistance)—full-time	£1,000
Eight Sub-Editors—one full-time	£900
Abstractors—all part-time	£2,200

The number of abstracts published in 1932 was about 25,000, of which some thirty per cent. relate to patents.

Apart from the procedure adopted to secure a comprehensive review of the field and to provide for control of the adequacy and accuracy of the abstracts, the problem of achieving efficiency with economy arises also in connection with the substance of the abstracts—notably their length. A satisfactory abstract should, of course, cover all the main points of chemical interest in the original paper, but in any case the form of the abstract should be direct and concise. Excessive diffuseness and unnecessary verbiage are in all circumstances undesirable, and, where economy is a prime consideration, represent simply a waste of money. In earlier days, when the need for economy was less pressing, chemical abstracts were undoubtedly too verbose, and the Bureau of Chemical Abstracts, during the ten years of its existence has been able, with the loyal co-operation of its editorial and abstracting staff, to effect a notable saving of space in this direction. For example, the average length of the abstracts of purely chemical papers has been diminished by about thirty-three per cent. in the course of four years. The significance of a reduction in the length of the abstracts will be appreciated when the steady increase in the *number* of abstracts published by the Bureau is borne in mind—*viz.*, 18,000 in 1928, 22,000 in 1930, and 25,000 in 1932.

The economy just mentioned has been effected partly by some reduction in the amount of detail (especially in the case of abstracts of papers appearing in the more accessible journals), and partly by steady insistence on the need for directness and conciseness. In the case of many papers dealing with subjects on the fringe of the chemical field, notably physical papers, the process of reducing the length of the abstract has gone so far that only the title, or little more, is reproduced. The Bureau of Chemical Abstracts takes the view that, even if space cannot be afforded for an abstract in such cases, it is very desirable, for indexing purposes, to have a record of the subject of the investigation, and of the author's name.

Closely related to these measures to secure economy, both in regard to abstractors' fees and the costs of production—setting, machining and paper—is the Bureau's decision to extend the use of abbreviations in the abstracts and to employ chemical formulæ instead of the names of common substances. Thus "concentrated sulphuric acid" becomes "conc. H_2SO_4 ," and "an aqueous solution of hydrogen chloride" becomes "aq. HCl ." Whilst the necessity for this change may be regretted from the point of view of literary form, and whilst the abbreviations may make the abstracts slightly more difficult to read, no real loss of clarity is involved. The resulting saving is

considerable, and it is estimated that the Bureau has in this way reduced its expenditure on the production of British Chemical Abstracts by about ten per cent.

It is scarcely necessary to remind members of this conference that one of the most expensive items in the *publication* of abstracts is the cost of composition; in the case of British Chemical Abstracts this works out at approximately £1 per page of 1,000 words. The relation of this figure to the other costs involved in the production of the abstracts will be apparent from the following data, which, it should be emphasised, are only rough, and cover both sections A and B of the abstracts:

Number of copies per annum	5,000
Number of pages per copy	2,500
Cost of composition, machining, and banding . . .	£4,000
Cost of paper	£750

Reference has been made above to the question of indexing, and the Bureau of Chemical Abstracts has given much consideration to the economies possible in this most important branch of its work. Given a particular system of preparing an index, large-scale reductions in its scope and bulk are out of the question, but it has been found that appreciable savings can be effected by minor adjustments in the set-up of the index. The alterations recently made in its Annual Index by the Bureau of Chemical Abstracts comprise the running-on of the items under a given author's name in the name index, the omission of the authors' names in the subject index, and the use of three columns instead of two.

The net result of these minor changes has been a saving of about £150 per annum, and this will be matched by similar economies in the production of the Collective Index to British Chemical Abstracts, now in hand. This publication, covering the period 1923-32, will likely run to something like 4,500 large quarto pages—a figure which illustrates vividly the magnitude of the work involved in chemical abstracting.

NOTE.

The chair was taken by SIR CHARLES SHERRINGTON, President of the Association. A comment was communicated by PROFESSOR A. F. C. POLLARD and can be seen by members on application to the office of the Association.

Books and the Farmer.

By SIR E. JOHN RUSSELL, D.Sc., F.R.S.

We are indeed fortunate to-day in meeting in this great City of Bristol—great not only by reason of its material wealth, but much more by its richness of historic associations, the courage and zeal of its early travellers and seafarers, and the high faith and enterprise of those far-sighted founders and patrons of its great homes of piety and learning: its Cathedral, its old public school, its grammar schools and secondary schools, and of more immediate interest to us, its University, the proud possessor of one of the most beautiful modern buildings in our land. And although Bristol is a large city and most of its citizens are necessarily urban in their outlook, and although most members of my audience are probably associated with town and city libraries, I do not feel that any apology is necessary for the subject I have chosen. There is no need for me to remind you of the importance of British agriculture. It is the third largest employer of labour in the country: it is fourth in order of productiveness, contributing about ten per cent. of the whole of our national output, and it occupies much more of our land than all other industries put together. The present time, moreover, is of special significance for agriculture: it is undergoing profound changes, almost a revolution. A long chapter of its history has just closed: a period that has lasted more than eighty years. It had opened in 1849 when the repeal of the Corn Laws threw our markets open to the whole world and so for the first time in our history exposed our farmers to serious competition from overseas—competition which at first had been stimulating but finally became devastating. The natural result of the removal of all trade barriers was the opening up of the great trade routes of the world so that we were able to buy wheat from Canada and Australia, beef from the Argentine, lamb and butter from New Zealand, eggs and bacon from Denmark and a host of other products from other countries.

After various trials and failures our farmers met the situation by producing only those things for which their land was best suited: they tended to become specialists. The methods would still have answered had free interchange of goods between one nation and another remained possible without the dumping that afterwards developed, but this was not so and changes had to be made. A new chapter opens this year with changes in marketing procedure and the institution of quotas and commissions, and our farmers once more hope for some degree of security of market. A greater change has been the attempt to organise the industry to ensure much more systematic production than we have hitherto had. Happily these changes come at a time when our farmers include many expert specialists able and willing to take advantage of the help that science and engineering can give them. They are not as yet great readers but that we hope will come, and here is where the help of the trained Librarian will be of profound importance.

There are two groups of readers coming within my title "farmer" for whom a library should cater: the expert adviser and the actual

tiller of the soil. On the whole it is easier, though perhaps more expensive, to cater for the expert than for the farmer. The expert knows what he wants: you can either supply it or you cannot. Expert treatises, however, have so short a life, and editions follow each other so quickly, that only the largest libraries can hope to keep up with them. Fortunately in agriculture some useful series of monographs have been published, and if these are kept up to date they supply the expert with the main outlines and put him in the way of obtaining the details. Two series of monographs should be in every library: the Ministry of Agriculture series, which are the cheapest of all, costing only a few shillings each*; and the Rothamsted series, dealing with agricultural science, costing rather more. These monographs give general accounts of the various aspects of agriculture and agricultural science and they furnish the expert with the references to books and journals from which the full details can be obtained. In addition certain government publications which are very inexpensive but of great value should be in all libraries that set out to help farmers and agricultural experts:

- (1) The Agricultural Statistics published annually by the Ministries or Boards of Agriculture for England and Wales, Scotland, Northern Ireland and the Irish Free State.
- (2) The Agricultural Output and the Food Supplies of Great Britain, 1929 (Ministry of Agriculture).
- (3) The Agricultural Output of England and Wales, 1925. This is one of the best accounts of English agricultural production that has yet appeared.
- (4) The Economic Series (Orange Reports) of the Ministry of Agriculture.
- (5) The Reports of the Empire Marketing Board: usually each deals with a particular group of commodities.
- (6) The Year Books of the Dominions.

These usually give the expert and the farmer all the information about farm products required for ordinary purposes. It is, however, necessary to warn the reader that he should study the footnotes to the tables and particularly observe the regions for which the statistics hold. There are so many pitfalls. The expression "the United Kingdom" changed its meaning on January 1st, 1922, when Southern Ireland became the Irish Free State and ceased to be included. Statistics before that date and after that date are therefore not directly comparable and some correction is needed. The Ministry of Agriculture and the Empire Marketing Board do not deal with the same region: the reports are perfectly clear, but the readers do not always take notice of the difference. The Ministry of Agriculture statistics refer only to England and Wales except in the summaries where they refer to Great Britain and the whole of Ireland, Irish Free State included. The Empire Marketing Board statistics on the other hand refer to the present United Kingdom including the Isle of Man and the Channel Islands but excluding the Irish Free State. The two sets of figures are therefore not comparable. Particular care is always needed in quoting statistics: personally I get mine checked by friendly

* The earlier issues were called Monographs; later ones are called Bulletins.

helpers at the Ministry of Agriculture or the Agricultural Economics Research Institute, Oxford, and, while one could hardly issue a general recommendation to this effect, readers should always be urged to discover precisely what the figures are intended to express.

It is a commonplace that no book ever gives quite the information one wants: the author always seems most obtusely to miss the one thing we wish to know about. Fortunately this difficulty has been largely overcome so far as the agricultural expert is concerned. Thanks to the strong line taken by the Imperial Agricultural Conference at Westminster in 1927, there are now established in this country eight agricultural bureaux the function of which is to supply information on subjects coming within their purview to any agricultural expert within the Empire. The prescribed channel of communication is through the official correspondent, but in practice a very liberal interpretation is put on this, and information is freely given to any *bona fide* enquirer. Certainly any enquiry from a librarian would receive full attention. The Bureaux are as follows:

<i>Subject</i>	<i>Name of Bureau</i>	<i>Address</i>
Soils, Fertilisers, and Crop Production.	Imperial Bureau of Soil Science. Director, Sir E. J. Russell	Rothamsted Experimental Station, Harpenden.
Animal Health and Disease,	Imperial Bureau of Animal Health. Director, W. Horner Andrews, D.Sc.	Veterinary Laboratory, New Haw, Weybridge, Surrey
Animal Nutrition: Relation of Food to Disease.	Imperial Bureau of Animal Nutrition. Director, J. B. Orr, D.Sc., F.R.S.	The Reid Library, Rowett Institute, Bucksburn, Aberdeen.
Plant Breeding, especially Cereals.	Imperial Bureau of Plant Genetics. Director, Sir R. H. Biffen, F.R.S.	School of Agriculture, Cambridge.
Grasses and Forage Crops.	Imperial Bureau of Plant Genetics. Director, Prof. Stapledon.	Agricultural Buildings, Alexandra Rd., Aberystwyth.
Fruit Growing and Transport.	Imperial Bureau of Fruit Production. Director, R. G. Hatton, M.A.	East Malling Research Station, Kent.
Breeding of Animals, Genetics.	Imperial Bureau of Animal Genetics. Director, F. A. E. Crew, D.Sc.	King's Buildings, Edinburgh University.
Parasites of Animals.	Imperial Bureau of Agricultural Parasitology. Director, R. T. Leiper, D.Sc.	Winches Farm, Hatfield Rd., St. Albans.

If the enquiry obviously fits any of these Bureaux it should be sent straight in and it will be answered: if a book or journal has to be consulted by the enquirer the appropriate reference will be given and you will be told where the volume could be borrowed. You need have no hesitation whatever in approaching any of the Bureaux and if you are in doubt as to which is the appropriate one, send the enquiry to the Soil Bureau at Rothamsted and it will be passed on to the proper quarter. I cannot too strongly commend the Bureaux

to your notice : they have very efficient methods for collecting and transmitting information on their special subjects.

Fortunately there are now in operation various methods for borrowing books and journals which the library does not possess. The National Central Library and the Science Library, South Kensington, suffice for most ordinary purposes. Many of the special books and journals wanted by the agricultural expert can be borrowed from the library of the Ministry of Agriculture, Whitehall, merely on payment of postage : the procedure is perfectly simple : you write up to the secretary on official library paper and the book comes by return of post. If the Ministry does not possess the volume the Royal Agricultural Society may possess it and be willing to lend it. The borrowing of journals is more difficult than that of books. The World List of Scientific Periodicals* shows the library in which (if available at all) it can be found ; alternatively the National Central Library (Malet Place, London, W.C.1) or the Science Library may be able to locate it and even arrange for it to be borrowed. Journals, however, are often irreplaceable and therefore not sent out on loan : in that event there is nothing for it but to tell the would-be borrower where to go and furnish him, if necessary, with an introduction. Our position at Rothamsted is that we are prepared to lend through the National Central Library any book that could be replaced if lost but we do not lend journals or books that are now out of print. We are, however, always glad to receive students and enquirers in our library and give them all the help we can in finding their way through the extensive literature of agriculture and agricultural science.

This question of Journals is a growing difficulty with which I confess I see no way of dealing. It is far worse than the problem presented by books. Most of us can decline to buy books on the score that if the book is a good one it will go into a second edition and we can buy it then, while if it is bad or indifferent we don't want it anyway. But a journal is different. It is the most dreadful and insidious form of compulsory purchase ever invented. If you are induced to subscribe for one year you feel you must go on : an incomplete or broken set is revolting to all the best feelings of the true librarian ; so for years the parts pile up, occupying good shelf space and draining financial resources to pay for the indispensable binding. Before the War the numbers were manageable ; since the War they have risen enormously and they still continue to rise. At Rothamsted, though we set up to be only an agricultural library, we have to take over 600 journals and periodicals. But it ill befits me to grumble for I took an active part in starting yet another one last year.

The reason is, of course, the enormous increase in numbers of scientific workers all over the world. At present every one of them feels bound, if he wishes to get on in life, to publish at least one paper a year. Enthusiastic heads of departments feel that they must grind out papers corresponding in number to the size of the department. Most of them, in conformity with university regulations, publish the students' exercises that gained the M.Sc. or Ph.D. degrees. Some publish almost all of their note-books ; some do even more.

* A new edition is now in preparation and will, it is understood, appear shortly.

"I don't mind him publishing his note-books" said one scientist of a colleague, "what I do object to is his publishing his entire waste-paper-basket."

But there it is! For the expert and the scientist this is the age of journals: and librarians are in the unfortunate position that a journal once taken must always be taken.

Of course the journals are not much read: they are received and entered up, particular papers are noted for possible future use; one or two may even be read. But they cannot be ignored, and so the Abstract Journal has grown up: a journal which itself publishes no original work but only abstracts of what appears in other journals. Those necessary for the agricultural expert are:

Biological Abstracts (superseding Botanical Abstracts and Abstracts of Bacteriology). (U.S.A.)

British Chemical Abstracts.

Chemical Abstracts. (U.S.A.)

Experiment Station Record. (U.S.A.)

Zentralblatt für Bakteriologie.

Biedermann's Zentralblatt für Agrikulturchemie.

Proceedings of the International Society of Soil Science.

The abstracts, however, often appear much later than the original paper, and as an early source of information the Agricultural Index published by the H. W. Wilson Company, is useful; it gives the titles of papers of agricultural interest appearing in current scientific journals.

Usually, the abstracts give the expert all the information he wants, but not always, and then he wishes to see the full paper. The reference may be to some journal unobtainable by the methods I have already described: perhaps some obscure journal the title of which is so abbreviated that even the language in which it is written is not recognisable. You need not despair, however; the Agricultural Bureaux may still help you, for they have in addition to their regular supply of journals (which they cannot lend out) a large number of reprints of separate papers which they can lend, and they can often obtain others which they do not possess. By applying to the Bureau you may be able to borrow a reprint of the paper wanted even though the entire journal be unobtainable.

The Bureaux are able to give still further help. Before the War practically all the important papers and reports in science and agriculture were published in English, French, German, and Italian. If you could read these languages you could review most of the progress in agricultural science and practice. But since the War the wave of nationalism which has done so much to complicate trade, industry, and economic activity, has been at least as effective in complicating scientific work. Russia, which formerly produced few—though good—papers on agricultural science, now publishes more voluminously than any other country, and almost invariably in Russian. It is exceedingly difficult to keep the sets of periodicals complete, so numerous are they and so sudden in their appearances and disappearances; as a further complication the numbering is not always consecutive and No. 5 may appear before No. 3. Yet the more important of them at any rate must be available to the

expert. If this were all it would simply add one more language to the list. But it is not all. Among the nations set free after the War are some very gifted agriculturists and scientific workers whose investigations cannot be ignored by an agricultural expert concerned with their particular subject. But with the liberation of the nations came also the liberation of their languages, which even the most ruthless oppressors never succeeded in stamping out. The use of their own language is for the people of these new nations a pious exercise which they most passionately and devotedly perform. Scientific workers in these newly liberated nations now publish in their own languages, and not, as before the War, in one of the great international languages. So an agricultural expert in this country, having obtained access to a paper he wants, may have the mortification of finding that it is published in a language which he not only cannot read but may not even be able to identify. The Rothamsted library now receives journals in twenty-four different languages, and still more are threatened. When some of my friends and colleagues in the Ukraine told me they were proposing to publish a new journal of agricultural science in their own language I retorted that we would flatly refuse to read it. Their reply was "We shall do such good work that you will have to read it." Our Armenian colleagues have gone a step further. They not only use their native language for their scientific papers but they have invented a new script in which to write it. The script is certainly attractive to look at; it is not broken up into any recognisable letters but has the easy flow and rounded curves of Persian. I recently sent up an Armenian paper to our translating staff for a summary but it came back with the comment "We are sorry, but we don't read fret-work." The Poles, the Czechoslovakians, the Hungarians, the Rumanians, the Latvians, the Palestinian Jews are doing admirable work in agricultural science and practice but publishing it in their own language. Some of these languages had never in the past been used for science or indeed for any high intellectual activity: they contained no scientific terms; sometimes not even a word to express so simple a notion as a "percentage." Quite undeterred by this difficulty the scientific workers have proceeded to make up new words to express modern scientific conceptions. I for one do not blame them: during the long years of oppression their language was the chief tie that kept them together; children learnt it from their mothers, sometimes under difficulties and even threats of dire penalty. By a true instinct they knew that so long as they kept their language they had the key which would one day loosen their fetters*, and now that they have their liberty they are remaining faithful to the old mother tongue.

It is quite usual for these workers to add a summary in one of the three common languages, English, French, or German, but this usually whets one's curiosity rather than satisfies it. One obvious solution would be to publish all the papers not only in the native language but in one of the three others: this, however, is overruled at once by the insuperable objection that the cost of printing, already almost unbearable, would be doubled, and the space on the library shelves would be consumed at double the pace; for when it comes to

* Quand un peuple tombe esclave, tant qu'il tient bien à sa langue, c'est comme s'il tenait la clef de sa prison.—(A. Daudet).

detailed discussions translations are not entirely valid evidence. The Bureaux meet the difficulty for all ordinary cases, as they are prepared to undertake or arrange for translations, and to furnish at very cheap rates photostat copies of tables, diagrams, or if need be the whole paper.

We turn now to books on agriculture ; an immense number from which all but the largest libraries must make a strict selection. A specialised library will, of course, choose its own line, but there is a central core of books that should be possessed by all libraries intended to help the farmer and the agricultural expert.

The basis of the selection should be by countries, and within each country by historical periods ; within each period by subjects. The justification for this arrangement is that agriculture is far more intimately associated with the life of the people than any other industry : it dominates the whole of the activities of the countryside and the outlook of all who dwell there. It is impossible to dissociate the great movements in country life from the great changes in agriculture. Moreover the time element plays a determining part in agriculture : the processes are governed by Nature and not by man, and you cannot hurry Nature's pace nor speed up the cycle of the seasons. Seed time, harvest time, lambing time, all these are set by Nature : we can make only minor changes.

As the guide both to the history of farming and to its literature I put first on the list Lord Ernle's *British Farming Past and Present* : by far the most complete history of the British countryside yet published. Among the shorter histories Mrs. M. E. Seebohm's *Evolution of the English Farm* (1927) is one of the most readable ; being well annotated it is also a good guide for further study. Curtler's *Short History of English Agriculture* (1909) is another good book for the student.* But you should also try to secure a few of the old books themselves, for they give character and dignity to a library. For students' use good modern editions should be obtained where available.

Agriculture was one of the first arts to be practised but one of the last to be written about : the classical writers, excepting only Virgil, were content to extol it without descending to detailed description. But there were some good Roman writers on agriculture and you should secure translations of Varro and especially of Columella, for the Roman practices they describe passed into France and Flanders and thence some of them came to England. Throughout medieval times these *Re Rustica* writers, as they are generally called, were preserved, and they were in great favour when printing first began : the Rothamsted library possesses no fewer than twenty editions between the years 1472 and 1598, and this represents only a fraction of the output. The books were paraphrased at the end of the thirteenth century by Petrus Crescentius, a senator of Bologna ; his work was copied in the days of manuscripts and printed in 1471 at Augsburg by Schussler ; the first book on agriculture to be issued from any press. The Rothamsted library possesses a perfect copy, and it is not only the first but, to my mind, one of the most beautiful editions ever printed on agriculture. It was very popular and lived longer than any book since published : our library contains no fewer than twenty-six

* For books on the economics of the countryside the List of Studies in Economics and Political Science of the London School of Economics should be consulted.

editions between 1471 and 1805, many of them folios beautifully executed. Curiously enough no English edition ever appeared, but a three-volume edition was issued at Milan in 1805 and is still sometimes obtainable.

English writers on agriculture seem to have owed but little to the Roman writers or to Crescentius, but they, too, were slow in starting, and it was not till fifty-two years after Caxton set up his press that the first book on agriculture appeared here.* It was Fitz Herbert's *Boke of Husbandry* (1523, but the more usual edition is 1534), one of the raciest and most typically English text-books ever written. The Early English Text Society reprinted it some fifty years ago (1882) and this edition should be secured if possible. But the language is somewhat archaic and country readers may not easily follow it.

It was during Elizabeth's reign that agricultural writers first got really busy in England and these authors are quite easy to read, though, in general, they lack both the brilliancy and the dignity characteristic of their time. They could, however, hardly manage to be dull, and even the printers' announcements were impressive. I always like the colophon used by John Wight (1578) in Heresbach's *Four Bookes of Husbandry*. "Imprinted at London for John Wight, dwelling in Paules Church-yarde, at the great North doore of Paules." Then came a duller period under the first Stuarts: the Star Chamber imposed restrictions on printing and, till its abolition in 1641, few agricultural books were published excepting only reprints of Gervase Markham—a writer that we find tedious although his great popularity with his contemporaries is shown by the large number of editions through which his books passed, and the well-worn and thumbled condition of the volumes left over to us. Then came the civil wars of 1642 to 1649 when again few agricultural books were written. Immediately afterwards, however, with the more settled form of government the flow started, and it began with two writers, Blith and Hartlib, whose works can still often be found in second-hand bookshops and should be obtained if possible. Blith (*The English Improver*, 1649) was one of the first of the new improvers and Hartlib an enterprising person who published other people's manuscript or letters without revealing their names and so obtained a good deal of credit that was not properly his. If possible you should get his *Discourse of Husbandry* (1650)—a rather scarce little book, or better still and more easily obtainable, his *Legacie of Husbandry* (1651). Both were written by Sir Richard Weston, a royalist refugee in Flanders, who relates how he saw there such crops and such grass, "so good to feed all sorts of Cattel, as the best meadows in the Countrie do not yield the like," which set him reflecting "what an huge improvement I might make of my own Estate if God almightie pleased to permit me quietly to enioie it": unfortunately for British agriculture this was not to be. Again comes a period which is blank for the general reader, though interesting to the student because enclosure was gradually proceeding and the necessary agricultural changes were being worked out. The scholarly-minded lover of woods and gardens will enjoy John Evelyn's *Silva* (1664) which Arthur Doubleday and Co. recently reprinted in two attractive volumes. If possible you should get a Mortimer,

* Curiously enough, Walter of Henley's book, famous in the thirteenth and fourteenth centuries, was not printed till 1890.

his *Whole Art of Husbandry* (1707) is one of the classics of agricultural literature, and if you live near the Chilterns get William Ellis, *Chiltern and Vale Farming* (1733) or *The Modern Husbandman* (1731); but you should in any case try to obtain Jethro Tull, *Horse-boeing Husbandry* (1731)—for choice get Cobbett's edition (1822 or 1829) because of the spicy preface: it gives a good picture of the farming outlook in those early eighteenth century days. The next fifty years produced little of direct agricultural interest: the patron still dominated literary effort and, during most of the eighteenth century, men with a gift for writing did not use their talent for agriculture.

There were, of course, diarists and letter writers, and one of these gives an excellent account of the details of daily life in the country: the Rev. James Woodforde's *Diary of a Country Parson*, 1758-1781 (Oxford University Press, 1924 onwards). Here are one or two typical entries: "Aug. 17th 1788. Begun shearing my Wheat this morning and gave the shearers according to the Norfolk custom as under: a good breakfast, at 11 o'clock plumb cakes with caraway seeds in them, and some liquor, a good dinner with plumb Puddings and at 4 Beer again . . . Will brewed this morning a barrel of Ale before he went shearing Wheat at 12 o'clock . . ."

Listen to this as a cure for ague—then very common in the countryside: "May 22nd 1779. My boy Jack had another touch of the Ague about noon. I gave him a dram of gin at the beginning of the fit and pushed him headlong into one of my Ponds and ordered him to bed immediately and he was better after it and had nothing of the cold fit after, but was very hot." To some farmer friends he gave this dinner: "Nov. 20th 1799. A fine Rump of Beef boiled, 4 fowls boiled and Bacon, a fine neck of Pork roasted, and quantities of plum puddings. Wine, Rum and Beer as much as they would. There was drunk 3 Bottles of Wine, of Rum 5 bottles. Sister Clarke and Nancy dined by themselves in the study."

Agriculture itself, however, made great strides from the middle of the century onwards. The experiments of Townshend and of Coke in Norfolk, and those of the Edinburgh Society in Scotland, provided a stimulus. The king himself was the great patron and before long Arthur Young was able to write: "The farming tribe is now made up of all ranks, from a duke to an apprentice." Once more agricultural writings were slow to appear, but towards the end of the eighteenth century the flood of writing began and has never since ceased. Among the early productions was one of the world's classics: Gilbert White's *Natural History of Selborne* (1789), of which you should have an attractive, well-illustrated edition so as to induce readers to take it. After this comes the spate. One of the great enterprises of the time was the survey by the Board of Agriculture, then first established, of the agriculture of Great Britain; this was done by counties and you should certainly have the survey of your own and, if possible, of your neighbouring counties. There were two editions: the early quartos (1793 and 1794) and the later octavos (1796-1813); on the whole the latter are more suitable and are also more easily obtained. The map, however, should be included: many copies have lost them. In this period comes Arthur Young, one of the greatest figures in agricultural literature, who could observe carefully and set down faithfully what he saw in crisp lucid English which

makes even his technical passages easy to read. Even on the shortest of lists of agricultural books he must find a place. Chief among his works are his travels in England and Wales : first in the south (1768), then in the north (1770), and then in the east (1771) ; afterwards to Ireland and France. All these have been recently reprinted in whole or in part so that copies are easily obtainable : the French tours by G. Bell and Sons, selections from the Irish tours by the Cambridge University Press, and the English tours by the London School of Economics. William Marshall belongs to this period, but is less interesting and would be included in the list only for local reasons, if at all.*

It is hardly necessary to delay over the nineteenth century agricultural writers : some of them possess considerable technical merit, but they do not come up to the standard of the nineteenth century farming. Agriculture suffers from the difficulty that its writers have usually been poor practitioners. Arthur Young is the outstanding example ; he is almost unequalled as an agricultural writer yet he failed when he tried himself to farm. He knew it : " My Mother," he says in his Autobiography, " proposed that I should take a farm. I had no more idea of farming than of physic or divinity. . . . And the circumstance which perhaps of all others in my life I most deeply regretted and considered as a sin of the blackest dye, was the publishing the result of my experience during those four years, (1763-1766) which, speaking as a farmer, was nothing but ignorance, folly, presumption, and rascality." (He is here referring to the *Farmer's Letters to the People of England*, 1767.) Two publications cover all that is usually wanted in regard to the nineteenth century : both are mines of valuable and interesting information : Morton's *Cyclopedia of Agriculture*, and the *Journal of the Royal Agricultural Society of England*.

About modern agricultural books it is difficult to speak because the subject has now followed the usual course and become highly specialised. First, and a long way first, I must put A. D. Hall's *Pilgrimage of British Farming* : a vivid picture of the farming of England written by one who, in our day, is unequalled as an observer and as a master of lucid and attractive English. It gives us a faithful account of the agriculture that is now passing away ; of the systems and methods in the stage of development they had reached before the War shook them so violently that it caused them all to totter and some to crash ; it is a record that will undoubtedly live long after many of our current books are forgotten. Two books are in a category by themselves : both are written by H. Rider Haggard, who, after acquiring immense fame for his books of adventure, turned farmer and wrote down his own experiences in *A Farmer's Year* (1899), and his impressions of British agriculture derived from personal visits in *Rural England* (1902). These volumes should certainly be obtained. As a reference work the twelve-volume *Cyclopedia of Agriculture* edited by R. Patrick Wright is still the most complete we have, though now nearly thirty years old. Messrs. Ballière, Tindall and Cox more recently published a good *Encyclopedia of Scientific Agriculture* edited by H. Hunter. A connected account of agricultural practice is given

* The London School of Economics has published a useful Bibliography of Travellers' Descriptions of England and Wales.

by J. A. S. Watson and J. A. Moore.* Four good books of reference on the British Islands are : H. J. Mackinder, *Britain and the British Seas* (1930); *Great Britain: Essays in Regional Geography* (1930); Dudley Stamp, *The British Isles: A Geographic and Economic Survey*; and the *Agricultural Atlas*, Malcolm Messer (Ordnance Survey). Whether you can possess these or not the little County Geographies of the Cambridge University Press should be obtained. Among periodicals the *Journal of the Ministry of Agriculture* should certainly be taken; also the reports and books issued from the Agricultural Economics Institute, Oxford, especially *The Future of Farming*, C. S. Orwin; and the publications of the Bureaux and the Experiment Stations. The Horace Plunkett Foundation issue some valuable reports on Co-operation. Other books worthy of consideration are : Viscount Astor and K. A. H. Murray, *Land and Life*; Lord Lymington, *Horn, Hoof, and Corn* (1932); Montague Fordham, *A Short History of English Rural Life* (1916); and C. Dampier-Whetham, *Politics and the Land* (1927).

For the rest the great difficulty is one of choice; I doubt if at any time in the world's history there were more books published on agriculture than now. The United States is the chief source of supply, and I marvel that they can all find a market; one is inclined to believe, with Pope, that—

“Where so much is said,
One half will never be believed,
The other never read.”

Most of the American works have, of course, little bearing on English farming, but one of Prof. Warren's more general books on United States agriculture (*The Agricultural Situation*, G. F. Warren and F. A. Pearson Wiley, 1924, or his *Farm Management*), would be an interesting and useful addition to our list.

Considering how much importance now attaches to Empire agriculture as a source of food for the Nation it is unfortunate that we have so few books dealing with it. I have given a general picture of it in my book *The Farm and the Nation*, but no more detailed account has yet appeared. The material can be got out from the official year-books, and something more vivid but less detailed is given in some of the travellers' books: I commend for example R. G. Stapledon, *A Tour in Australia and New Zealand: Grass Land and Other Studies* (1928). Duckham's *Animal Husbandry in the British Empire* (1933) deals with the live-stock side of the industry.

These various books would take a little time to collect, but they would not cost much and they would give the expert, the good farmer and the intelligent general reader a broad view of the subject and, at the same time, sufficient detail for all ordinary purposes.

I should, however, like to see the libraries go much further than this and endeavour to arouse among farmers themselves a taste for good reading. Perhaps this lies outside your province; it is, however, so important that I still feel justified in bringing it before you. There are certain difficulties. Farmers as a body do not belong to either of the present-day leisured classes: they have only little spare time, and that is in the evenings when the long day's work is done. They read the technical agricultural press which is now very good, and

* Watson and Moore. *Agriculture, The Science and Practice of British Farming*.

thanks to the devoted labours of the County Organisers and the Advisory Officers they are kept informed of modern developments in agricultural science and practice. But their active outdoor life, with the early morning start, is not conducive to serious reading of books in the evenings. In general, too, the farmer has little temptation to buy books. If you look round the bookshop in an ordinary market town you can easily walk out without buying anything. I have asked some of my publishing friends whether they could not make some joint effort to create a greater demand for books among agriculturists and other dwellers in the country, but the difficulties seem to be considerable. In farm-houses one is more likely to find books on agriculture of the period 1820 to 1870 than of 1900 to 1930. In the olden days some of the packmen carried books round and ensured some sort of distribution: now there is nothing of the kind. It is easier to buy a modern book on agriculture in Oxford Street than in a market town where farmers foregather weekly. Except where a school teacher vigorously encourages and stimulates it there is probably less reading of good books in farm-houses now than thirty years ago. In those days the *Pilgrim's Progress* was still widely read, and, more important still, many farmers began the day's work by the reading of a chapter from the Bible and of a prayer from the Daily Service. Considered simply as a daily exercise in good literature the procedure was good: it laid the foundation for the development of personality and power of shrewd comment that has always characterised the best men and women of the English countryside, whether landowners, farmers, or farm workers. Volumes could be filled with the expressions of the old generation of farm workers: I remember our first tractor once coming to a standstill in the field, and the old workers making scathing comments while the driver looked for the cause of the trouble and found a small insect in the carburettor: "Look!" said one of them, aptly paraphrasing St. Paul, "how the weak things of the world do confound the things which are mighty!" Unfortunately all this is passing: and instead we have the Sunday paper and the "talkie," which again considered simply as exercises in literature, form a poor exchange. There are, however, two new factors at work which may yet do much to bring good books into the farm-house and the farm worker's cottage: the wireless, which has already brought so much pleasure into country life; and the County Library, the branches of which are often worked from the village school. Both teachers and scholars have told me how much the books are appreciated, especially in the remoter places where the winter evenings seem very long. There should be available three classes of books for circulation:

- (1) Good general literature, including fiction, travel, history, biography, science, poetry, and essays (these are not placed in order of merit though it may happen to be the order of general preference).
- (2) Good literature dealing with country life.
- (3) Technical and educational works such as I have already described.

Of the first group I shall say nothing except that a great responsibility lies upon the person making the selection because he or she can

foster or kill the taste for reading in many a country household. Country tastes are clean and robust: there is no room for the sickly, morbid, or prurient, and no appreciation of the oversubtle: but English literature happily contains vast stores of clean, healthy, vigorous writing that will stir the imagination and quicken new interests, so adding greatly to the richness of country life. But of the second group I must say something.

Literature dealing with country life ought, on the face of it, to be very popular among country readers. People are more interested in human beings than in anything else and the English countryside is perhaps unique in its wealth of good and almost unexplored material. The story of how the countryside was hewn out from the primeval forests, how the waters were confined and the pestilential swamps converted into rich farm land has the makings of an enthralling tale, but so far it has hardly been told as it deserves. The farm itself is rich in good material, yet only once has it been the subject of great literature and that was long before our time. Virgil's *Georgics* stand alone as the undying epic of the farm. The countryman can still read it with pleasure and marvel at the depth of understanding, the richness of language and the wealth of imagery that have caused this book to live through the ages and to be passed down lovingly from one generation to another as something to be prized and handed on: the possession not of one age but of all. It is available to all readers now, set out in stately, glowing English by Mackail.

But if there was only one Virgil, there have been many others nearer to or in our own time, writing faithfully, sometimes even caressingly of the things of which we know; who, seeing beyond the surface of things to the motive power behind, and reading the thoughts of men whose words are few, show us something that we had missed. No two people would make up the same short list, but there are a few names that can hardly be left out. First in order of time comes Tusser, the pre-Elizabethan poet or rhymester (whichever you prefer), who from Eton and Cambridge took to farming and failed, but left us some rhymes which for their rugged sanity have lived through this last 400 years, and two fine editions issued within the last three years show that they are still good for a long life yet. His *Five Hundred Points of Good Husbandry* should be on the shortest list.

Somewhat later comes an account by an adventurous spirit, Celia Fiennes, of a journey round England made on horseback in 1697 in which she describes the things she saw and the people she met. She went from her home in Wiltshire up to the border and even ventured into Scotland. But there she could not remain: "They live in so nasty a way, I rather chose to stay and see my horses eat their provender in the stable than to sit in ye roome for I could not bring myself to sit down nor to Eate any of the food they should order"; then back to London and then to Cornwall. The manuscript was first published in 1888. Another early account is Daniel Defoe's *Tour of England* in 1724, a delightful book full of touches of humour. Several modern editions are available, ranging in price from the two volumes in Everyman's Library to Peter Davies' beautifully printed edition of 1927. After Defoe the eighteenth century produced

no good writer about the country till near the end, when three arose* : Arthur Young and Gilbert White, whom I have already mentioned, and William Cobbett, peasant son of Surrey and one of the most striking figures that ever stalked the English countryside, second only to John Wesley in the impression he made upon the people as he passed. Stern and rugged, hating bitterly everything effeminate and soft, contemptuous of all Jews, stock jobbers, and citizens of London generally, he was an ardent lover of good farmers and good animals. For him land and animals unfit for agriculture were altogether baneful. London was always the "Wen"; the Surrey heaths were abominations; Hindhead "certainly the most villanous spot that God ever made." For him, bread, beer, beef, and bacon were the divinely-ordained foods of an Englishman; tea and potatoes were disgusting if not dangerous: "It is notorious that *tea* . . . besides being *good for nothing*, has *badness* in it." As for the potato: "It will bring English labourers down to the state of the Irish . . . it is the root of slovenliness, filth, misery, and slavery; its cultivation has increased in England with the increase of the paupers: both, I thank God, are upon the decline . . . Englishmen seem to be upon the return to beer and bread." You should have in your library his *Rural Rides*† and also his *Cottage Economy* for its vivid English and its vigorous tirades against the changes then beginning in the countryside. But he had a good eye for the country and his descriptions hold us so that we have to read on.

Next in point of time to tell about the countryside comes George Borrow—another Eastern Counties man. *Lavengro* and *Romany Rye* should be on the farmer's list, though I am not quite sure whether the young people will like them. He doesn't deal with agriculture: he is vexatiously silent about the changes in farming that were then taking place; he was a tramp, or, rather, a super-tramp, who loved the road and the ale-house on the heath, boxing, and horses; he gave us, too, that wonderful creature Isopel Berners, who is surely fit to stand beside Hudson's Rima and Galsworthy's Megan David. But he afterwards married and settled down, and his later books need not go on our list. Wren Hoskyns' *Talpa, or the Chronicles of a Clay Farm* (1847) should be added, if possible the edition with Cruikshank's illustrations. Among the modern writers there is almost overwhelming difficulty of choice. Happily there is growing up to-day a new kind of literature faithfully describing the life of the countryman as it is, yet written with such insight and with so human and personal a touch as to have all the charm of a romance. Truth is, indeed, the secret of all eloquence and virtue. The forerunner was Richard Jeffries, the gamekeeper-writer who charmed our fathers fifty years ago, and his *Wild Life in a Southern County* and *Round About a Great Estate* still deserve a place on our list. Then came W. H. Hudson. His *Shepherd's Life* must be on the list, and, if you are in the West Country, his *Land's End*.

Later ones I put in alphabetical order. There is Adrian Bell—

* This was also the time when François de la Rochefoucauld visited Suffolk (1874). His vigorous account of what he thought of the place and the people should certainly be read by the natives of that county. The Cambridge University Press has published the book (*A Frenchman in England*, 1933).

† William Reeves has a good edition, edited by Pitt Cobbett.

you all know his *Corduroy*, the account of his farming experiences written so vividly that farmers can follow them with delight. George Bourne's biographies of himself (*The Wheelwright's Shop*) and his man Bettesworth (*The Bettesworth Book* and *Memoirs of a Surrey Labourer*) and his *Change in the Village* appeal to a wide circle of readers. Then there is Sassoon, whose *Memoirs of a Fox-hunting Man*, while not an agricultural book, is full of the life of the country; and, of course, A. G. Street, our most recent discovery—a Wiltshire dairy-farmer blessed with a keen eye for human character, a retentive memory, a cheerful outlook on life, and a great gift of writing, so that he can set down the things he has seen and heard and can make his sturdy farm workers talk before us. His *Farmer's Glory* is likely to last a long time.

I shall not, and could not if I wished, attempt to deal with the long list of writers of fiction who localise their stories and so bring in descriptions of people and of scenery recognisable as types by those who know the country. Of course, place must be found for some of these, but the choice must be left to the local expert. Trollope should be included in any list, and in hunting regions perhaps Surtees, though without the illustrations the present-day reader would probably not get far with him. Towering above them all, of course, is Hardy, and no library could leave him out. Nor could Quiller-Couch be omitted from Cornwall or Sheila Kaye Smith's novels from Sussex, or Mary Webb's from Shropshire. Finally, even on the shortest list we should put Victoria Sackville-West's poem *The Land*. It is a beautiful piece of work that would be widely appreciated by country readers.

Of course, there are many more, for happily there have always been men and women who have known something of the joy of the life-giving earth and the peace of a quiet garden, who in their dreams have walked—

Where a voice of living waters never ceaseth
In God's quiet garden by the sea,
And Earth, the ancient life-giver, increaseth
Joy among the meadows, like a tree.

The County Libraries to-day have a great opportunity of introducing good literature to the countryman. It is a time of great changes, social, economic, and technical; old customs are dying out, new ones are not yet established: just the time, indeed, when new tastes can be fostered and the countryman made to realise something of the rich heritage of English literature that has come down to him, and of the worth of some of the books written in our own day.

NOTE.

The chair on this occasion was taken by DR. STANLEY H. BADOCK, Pro-Chancellor of the University of Bristol, who remarked that he had never before listened to a bibliography that was so interesting. Appreciations and discussion followed in which the following took part: MR. B. M. HEADICAR, MR. A. W. LING, MR. J. McADAM, MR. B. C. CURLING, and MISS M. HALL.

Classification of Subject Titles in Engineering Periodicals

By S. WATTS GIBSON

Skeleton Classification to be used as a Guide by Editors and, if possible, Authors.

The idea ventilated in this paper arises naturally as a corollary to the subject of the paper read before the ASLIB Annual Conference last year by Dr. Bradford entitled "Systematic Subject Indexes to Periodical Volumes." It is a small corollary, but the centre is a small part of the circle, and if, upon investigation, some of the vagaries were recognised as what they correctly are, namely eccentricities, a search for the centre would be indicated. If this centre could be found and used, then many of the difficulties would automatically cease to exist and indexing would follow a natural smooth course.

The claim made in this paper is that the centre has been theoretically located and the problem now is, can that centre be actually reached and used. To drop metaphor, if control could be effected at one stage earlier and editors could control the titles of papers in periodicals on an agreed classification, then not only would indexing be simplified, but searchers, specialists at least, would gradually memorise the classification and in actual fact not need to refer very often to the index.

From the paper mentioned above and elsewhere, it appears that one of the difficulties experienced in preparing an index is due to the fact that the titles of articles in periodicals are not selected in accordance with a system. It seems as though authors and editors, being immersed in the business of the moment, were led to put down haphazard titles, often with local colour and from a temporary view-point. As things are, they can hardly be blamed for this, and might even welcome some such guide as suggested in this paper.

It may be objected that such a guide could not be international owing to the linguistic difficulty, but if the arrangement were based upon the U.D.C.* notation the difficulty would disappear. The essential point is that the ideas, apart from the language in which they are expressed, should be arranged in accordance with a system based upon the decimal notation, then the ideas could be translated into any language.

This paper deals with a very limited portion of a subject, but sight is not lost of the fact that this detail has to fit into a larger scheme. For the purpose of the argument the whole may be taken as "The Library" with three divisions :

1. Books
2. Periodicals
3. All other

This paper deals with that part of division 2 which might come under the control of editors of papers contributed to periodicals and may be called—The Classification of Subject Titles in Engineering Periodicals.

* Universal Decimal Classification.

The Euclidean method of discussing the subject would be :

There are two axioms, viz. there are only two methods of arranging an index :

- (a) Numerical
- (b) Alphabetical

- (a) The ultimate object of the numerical index is to place the volume in a given location on the library shelf. The book is placed in that position where it can be found by its numeral and, when found, is among books dealing with subjects in the same class. This is the major idea and can be amplified by sub-division to the desired extent.
- (b) The alphabetical subject index is subsidiary, but a necessary means to the end. From it is obtained a master number giving the approximate location on the shelf. At present it is important that this index be controlled rigidly by one person, but the object of this paper is to suggest that this could be extended if an agreed guide were issued by some authority.

As already stated, the suggestion made in this paper is that the control of the index should be put back one stage further, that the editor should control the Titles of Papers printed in his Periodical.

If it were possible to get Editors of Engineering Periodicals to make use of an agreed guide and thus to control the titles of papers appearing in their Periodicals on some such basis as the Classified Subject Index, already worked out for use in the Science Library, a definite step forward would have been taken.

In fact, some such control, either consciously or sub-consciously, must have been exercised in many cases already, and I am emboldened to pass on the suggestion because I have access to unpublished papers which have been titled and indexed on such a controlled title basis. These records go back some thirty years, and I have been responsible, for such control as has been found possible, for some twenty years.

Three schemes have been tried for three slightly different sets of papers relating to engineering apparatus :

- (a) A set of notices dealing with specifications. (Description, rating and guarantees.)
- (b) A set of instructions dealing with manufacture.
- (c) A set of reports dealing with design. (Underlying theory and calculation or results of tests.)

INDEX TO SET (a)—SPECIFICATIONS.

This is in the form of a straight alphabetical index, which is typed and brought up-to-date annually, but owing to the comprehensive nature of its present form very few additions are necessary. It consists of thirty typed quarto sheets and includes 300 items, thus it is too long to reproduce here in extenso. Some abstracts are given below as an illustration :

Binders.—Sizes of publications, forms, binders, and punching.

Circuit Breakers.—Carbon break, by type, alphabetically.

Oil immersed, by type, alphabetically.

Contactors.—For use on A.C. circuits, by type, alphabetically.

For use on D.C. circuits, by type, alphabetically.

Controllers.—By type, alphabetically.
Finish.—Standard, for machine and apparatus.
Generators.—A.C., by type, alphabetically.
 D.C., by type, alphabetically.
 Parts, alphabetically.
Instruments.—Horizontal edgewise.
 Round pattern.
 Sector pattern.
Motors.—A.C. Induction, by type, alphabetically.
 A.C. Synchronous, by type, alphabetically.
 D.C., by type, alphabetically.
 Parts, alphabetically.
Switchboard panels and switchgear.—By service, alphabetically.
Temperature guarantees.
Terms.—List of terms, alphabetical.
Transformers.—By service, alphabetically.

It will be noted that some of the machines and apparatus are arranged by type. This may be described as a specialist's method of classification combined with a brief code. In general the first place type letter denotes an underlying principle of operation, and the second place type letter denotes major features in the construction. Further minor differences in construction are covered by form letters. At the present time this nomenclature, classification or code is rigidly controlled by one man.

Two examples will serve to illustrate the above :

TYPE DB, FORM D MOTOR.

1st place type letter D denotes that the motor is suitable for use on D.C. supply lines.
 2nd place type letter B denotes, arbitrarily, the construction.
 Form D denotes that the field coils are mummified.

TYPE IX, FORM M MOTOR.

1st place type letter I denotes that the motor is suitable for use on the A.C. supply lines.
 2nd place type letter X denotes that the motor frame is of the box pattern.
 Form M denotes that the motor is fitted with slip rings.

INDEX TO SET (b)—MANUFACTURE.

This index is divided into six sections, the details in each of which are arranged alphabetically by subject. The six sections are as follows :

<i>Section.</i>	<i>Typed 4to sheets</i>
I General	21
II Control gear for electrical machines	12
III Machine A.C.	3
IV Machine D.C. (except traction)	5
V Traction, electric	2
VI Nomenclature (Classification)	5

Total 48 sheets

Covering some 2,400 items

The reason for the grouping is that as a matter of practice the index was found to be very bulky, and a given group of engineers was often interested in only a small section. For instance, the whole index consists of forty-eight sheets, but the A.C. engineers are only directly interested in three sheets, less often they refer to the General Section and the Classification.

Each group of engineers is supplied with those sections only in which it is interested. In practice this is found to greatly facilitate the finding of the required instructions.

INDEX TO SET (c)—DESIGN.

This index is in the form of a subject card file classified and arranged alphabetically. The titles of the reports are controlled by a master set of instructions which include a classified list originally based on the Dewey Decimal System. No deviation must be made from this list without the authority of the man in control, and any such addition is immediately entered in the master set of instructions mentioned above.

In order to indicate the scope, the major subject headings are given :

- (a) Generators, Direct Current.
- (b) Generators, Alternating Current.
- (c) Transformers.
- (d) Motors, Direct Current.
- (e) Motors, Alternating Current.
- (f) Rectifiers.
- (g) Switchgear.

(a), (b) and (f) in addition to the alphabetical sequence are arranged in order of kW. capacity, speed and volts ; while the sub-divisions for (d) and (e) are arranged for h.p. capacity and speed.

In addition to the machines and apparatus listed above the reports deal with the properties of Engineering Materials and Miscellaneous Subjects, and in all cases the titles of the reports are divided into two headings :

1. Subject of report.
2. Nature of report

A COMMON FEATURE—CONTROLLED TITLE.

One feature common to the three groups dealt with above is that the title is always controlled by an authorised master classification.

I note that Dr. Bradford last year referred to a concealed classification, together with an elaborate system of cross references. It would thus appear that his experience has run along similar lines, and in effect what I am suggesting is that the classification should not be concealed, but on the contrary, it should be authorised and used by editors to control the titles of papers to be published.

In any alphabetical system cross references appear as a difficulty, and unless the titles are controlled it would seem that cross referencing involves an elaborate system, but by controlling the titles it has been found possible to reduce cross references so that they become few and simple. One example will serve to illustrate this point :

A certain piece of apparatus has been variously known by the names "Fuse," "Cut-out" and "Fusible Cut-out." It was

originally decided to authorise the title "Fusible cut-out," and cross reference cards for "Fuse" and "Cut-out" are marked "See Fusible Cut-out," but no details are entered under these headings. The effect of this is to so train the Staff that all reports on this subject are automatically headed "Fusible cut-outs."

Under the present day specialised and concentrated system of education and training provided for experts, the use of the English language as a working tool is somewhat neglected, also while experts are happy about employing many other kinds of machines for mass production, it is somewhat difficult to get them to realise that a certain amount of agreed routine is really a mass production contrivance for making oneself rapidly understood when wishing to convey ideas to other experts, or to convey instructions to the workshop.

It seems to have some bearing upon the mentality of the case to recall that Mr. Horace Hart's "Rules for Compositors and Readers at the University Press, Oxford" was originally produced as a personal guide, but from his preface it appears that he received so many requests from friends and others who had seen a copy that he decided to publish it, and thus make it available to everyone prepared to pay the small price charged. The first edition was issued in 1893 and it had, by 1930, run into twenty-nine editions. This little book owed its success to the fact that it appeared when people were finding a difficulty owing to the lack of a guide; and it may be that the difficulties which librarians, editors and authors are now experiencing would be met by a guide of authorised titles.

It is difficult to suggest how, or by whom the guide should be prepared, but two sources of information occur to me. The Science Library have a guide which they use in connection with their numerical index system, and a simple abstract might be made from this giving suggested titles under two headings, such as—

Subject of article.

Nature of article.

The other source of information which might be used is the Subject Index to Science Abstracts, which has dealt with articles published in Engineering Periodicals for a large number of years.

The methods of controlling titles of specifications, instructions, and reports detailed in the early part of this paper have been worked out in a limited sphere. They deal with highly technical points and precise detail, and while it cannot be hoped that the detailed methods would have much application outside the particular circumstances, it may well be that in principle the same major arguments apply. Certainly the need has been felt both in the larger sphere of a library, and the more limited requirements of a particular engineering firm, and for these reasons the paper has been written more with a view to ventilating the subject and voicing a need, rather than putting forward any definite suggested solution. At the same time an effort has been made to describe how the need has been met in a specific case.

The main headings of the guide used by the writer are printed as an Appendix, but it should be remembered that the original draft was made more than thirty years ago, based upon the Dewey Decimal System as then published, but somewhat freely handled to meet a

specific and local need. It does, however, illustrate the fact that at that date a need was felt to associate ideas (rather than words) in some naturally related sequence co-related to some common notation, and thus avoid the language difficulty.

SUMMARY.

Throughout this paper an effort has been made to avoid unnecessary detail and to reiterate the fact that, generally, one of the troubles of a librarian is that he has not control of the titles of articles appearing in periodicals, which he has to index, and there seems no prospect of his having such control, but it would serve the same purpose and ease his difficulties if authors and editors could select titles in accordance with a guide.

Such a guide would probably have to be produced in sections. The arguments in this paper are all based upon experience in electrical engineering and it must be left to others to say whether the arguments have a wider application.

It seems probable, with experience already gained in decimal classification, that the ideas may be so set down and related to numerals that the guide could be translated into any language.

APPENDIX.

ABSTRACT FROM GUIDE TO AUTHOR AND EDITOR RE TITLES.

Title for indexing must be in accordance with this Index. No title should be used unless it appears in this Index. New sections may be added at the discretion of the Chief of Data Department.

E.3 ELECTRICAL ENGINEERING

- E.3000 RULES, REGULATIONS, AND ROUTINE OF A GENERAL NATURE
- E.301 PERTAINING TO BOTH DYNAMOS AND MOTORS
- E.3011 General
- E.3012 Armature
- E.3013 Commutator or Collector
- E.3014 Field
- E.3015 Mechanical
- E.30151 Bearings
- E.3016 Air Gap
- E.3017 Insulation Tests
- E.3018 Brushes and their Holders
- E.310 GENERATORS OF ELECTRICITY IN GENERAL
- E.311 Generators, D.C.
- E.312 Generators, A.C.
- E.313 Batteries, Primary
- E.314 Batteries, Secondary
- E.32 DEVICES FOR TRANSFORMING ELECTRICITY INTO OTHER FORMS
- E.321 Motors, D.C.
- E.322 Motors, A.C.
- E.3221 Synchronous Motors
- E.3222 Non-synchronous Motors
- E.323 Lamps, in General
- E.3230 Lamps, Arc.
- E.3233 Lamps, Incandescent and Fittings
- E.3234 Lamps, Focussing
- E.3235 Lamps, Ray
- E.3236 Lamps, Mercury Vapour
- E.325 Heating Devices
- E.326 Devices for Making and Breaking Mechanical Contact

E.3260	Electro Magnets
E.3261	Brakes
E.3262	Clutches
E.33	DEVICES FOR CHANGING THE STRENGTH, INTENSITY, FREQUENCY, OR
	KIND OF ELECTRICITY
E.3311	Transformers, Static
E.332	Devices for Changing Alternating to Direct and Direct to Alternating
E.3321	Rotary Converters
E.3322	Motor Generators
E.3323	Rectifiers
E.334	Appliances Partaking of the Nature of Resistances
E.3340	Shunts
E.3341	Rheostats, Starting
E.3342	Rheostats, Field
E.335	Appliances Partaking of the Nature of Reactances
E.337	Appliances Partaking of the Nature of Condensers
E.34	CONDUCTIVITY SYSTEM
E.3401	Theory of Switching
E.3402	Distributor Boxes
E.3411	Switchboard
E.34115	Substation
E.34118	Distribution Boards
E.3412	Switchboard Panels for Specific Purposes
E.3414	Switches and Devices for Opening Circuit
E.3415	Switches and Devices for Opening and Closing Circuit
E.3416	Switches controlled automatically by other power
E.34161	Pneumatically controlled
E.34161	Pneumatically controlled
E.34162	Hydraulically controlled
E.34163	Clockwork controlled
E.342	Conductors, Cables, etc.
E.343	Insulators
E.35	INSTALLATIONS
E.350	Systems
E.3501	Systems of Lighting
E.3502	Systems of Locomotion
E.3503	Systems of Power Transmission
E.37	MATERIALS
E.371	Magnetic Materials
E.372	Non-magnetic Materials
E.373	Insulating Materials
E.375	Preserving Materials
E.376	Lubricating Materials

NOTE.

The chair was taken by DR. S. C. BRADFORD. A discussion followed concerning the practicability of Mr. Gibson's suggestion, and contributions were made by the CHAIRMAN, DR. W. BONSER, MR. H. H. JOHNSON, MR. C. H. GRAY, MR. A. A. GOMME, and others. The account of the discussion can be seen by members on application to the office of the Association.

Recent Developments in Equipment for Special Libraries.

By B. M. HEADICAR, F.L.A.

In the short time at my disposal I want to introduce to you various improvements in library furniture and lighting which represent, I think, the very latest ideas in each case. The advent of steel shelving had generally meant the use of some very dark green or sombre hue in enamel paint which did not add anything to the brightness of a reading room. In order to relieve this dullness bright colours have been selected for the steel shelving in the new rooms at the London School of Economics, geranium red, orange, and primrose all being in evidence in rooms which have no sunlight. The general effect is a sort of synthetic sunlighting which is certainly pleasing.

The Snead rolling stack can be confidently recommended for all departments where congestion is a problem. For the first time it is now possible to have bookcases fitting close together without having to use rails or gulleys or hangers for them to run on. Ordinary stacks of Snead steel shelving can be converted into rolling stacks by the fitment of the patent carriage and the shelf accommodation doubled without increasing floor area.

The Snead stack light reflector has solved a difficult problem—that of lighting bottom shelves without the need of excessive candle power above. The principle is control of light by means of penetration and reflection from a perforated surface which distributes the light evenly over the surface to be illuminated, whether directly opposite the reflector or near the floor of the stackroom. Made of aluminium, the reflector is sanitary, unbreakable, and economical; dust cannot collect on the reflecting surface, while the interior can be cleaned and bulbs replaced without removing the reflector.

The "Bishop" reading lamp is the last word in table lighting. It is designed to give a diffused light uniformly distributed, by the aid of mirrors, over the whole table area, with an entire absence of glare. Readers seated on both sides of the table are served by one lamp, and the result is a doubling of the light obtained and a halving of the current consumption. The lamps can be simply constructed of metal or can be made as ornate as required, of metal and wood, to suit any architectural desires.

The "Polecon" shelf light is an adaptation of the miners' hand lamp, with yards of flex which is wound on a spring inside an oxidised metal globe, thus enabling the full light of the lamp to be shown on the most extreme book on the bottom shelf. Its most important feature, perhaps, is that the hook on which each lamp is hung serves as a switch, so that when the lamp is lifted off the hook it lights up, and when it is hung up again (there is no other place to put it) the light automatically goes out. Librarians who have experienced the wastage of current caused by readers who failed to switch off under the old system will appreciate the advantages of this lamp, which

was designed by myself, as was also the "Polecon" periodical display rack, of which I have a model here. This rack consists of a sloping shelf (14in. deep and of any length up to 3ft.) hanging on hinges only 3in. from the front of the shelf, which enables the whole front cover of a periodical (not more than 14in. long) to be exhibited. This shelf rests on a fixed flat shelf (17in. deep) on which back numbers of the periodical exhibited can be filed free from dust, etc. The sloping shelf is just raised on its hinges when back issues are wanted, while a continuous label holder on the bottom edge indicates the position of the periodical above.

Lastly, there is the cinéscope, with its complement, the ciné-camera. The latter is practically a vest pocket camera containing rolls of film, sufficient to photograph 200 objects, each photo being about the size of a postage stamp. Documents, books, articles in periodicals, landscape, can be rapidly and instantaneously photographed, and the films exhibited through the cinéscope. This is a portable projector which can be fixed on the back of a chair, the plug fitting into any electric light point of whatever voltage. If desired, a picture can be projected, 14ft. square, on to a wall, ceiling, floor, sheet of paper—in fact, almost any surface, and even in broad daylight a remarkably clear definition is obtained. Congested shelves can be readily put right by photographing such of the contents of books as may be required and disposing of the volumes. The whole apparatus is contained in an attache case about 18in. square—camera, projector, and film slides for hundreds of lectures can be carried in the same case. The apparatus can solve all sorts of difficulties and, although it has been talked about before, it is only recently that we have found it possible to get one into this country from Belgium. There does not appear to be anything like it made here which has its extreme portability. I ought to say that all the things I have described above can be seen at the London School of Economics. They are all the results of very considerable research, and I believe represent, in each case, the most efficient thing yet manufactured for the particular purpose.

Bibliographical Work in Connection With the Overseas British Empire.

By EVANS LEWIN, M.B.E., F.L.A.

Librarian of the Royal Empire Society.

It was Charles Lamb who divided books into two categories; books, and books that are not books, such as directories, pocket books, scientific treatises, almanacs, statutes, and similar publications, including, with characteristic unconcern, the works of Hume, Gibbon, and Robertson. I fancy that the gentle essayist would also have embodied bibliographies in the latter category, the more certainly if he had ever been engaged in their preparation. Types of bibliographies are almost as numerous as classes of literature and the definition of the word bibliography is sufficiently wide to cover almost every variety of catalogue that has been issued, from those giving the fullest and minutest details of the form, type, and composition of a book as a typographical production, or the most elaborate annotated catalogue illustrating not only form and type but also the subject matter and history of the book, to the most inefficient, from a bibliographical point of view, list of mere titles and subjects designed solely as a guide to the elementary student.

The old-fashioned and academic view that a bibliography to be of value must contain all the available information about the form of a book—size, full title, place of publication, printer, date, and the hundred and one specialities that differentiate one book from another—although holding its own for the specific purposes of the book-collector, as distinguished from the book user, has long given way to a wider appreciation of the value and scope of a good bibliography; just as the term “book” may now be held to include almost any printed or even written matter whether it be dignified as a book or is a mere pamphlet, article, or even series of newspaper cuttings, that may contain specific and presumably useful information. I am not going to discuss here the essentials of a good bibliography, for everything depends upon the purpose it is designed to serve, and what may be regarded as an excellent piece of work by one authority may be utterly useless for another. Later I shall endeavour to illustrate this point by reference to the methods employed in a few outstanding bibliographies within the broad scope of this paper; but at present, I shall divide my subject into three main headings and leave the essentials of a good bibliography to the last.

The three main divisions of this paper are as follows: what has been achieved in the broad field of empire bibliography and in the specific portions of the empire; the characteristics of the various bibliographies and the literature they represent; and what remains to be done in order to co-ordinate and carry on the work,

The British Empire and its various parts may be regarded from many points of view. One thing, however, is certain. It cannot be looked upon as a geographical unit. Specific bibliographies, although they may be compiled upon a geographical basis, can be divided, therefore,

into as many different subjects as the bibliographer desires—history, economics, constitution, relations with natives, education, mining, geography, discovery, communications, or administration—and recent bibliographical work on a small scale, such for example, as the bibliographies issued by the Royal Empire Society or the Historical Association, as a matter of fact, has consisted of such subject-bibliographies suitable for the use of elementary students working upon one or other of the aspects from which the British Empire may be regarded. Bibliographies of the empire as a whole, however, must necessarily be approached from the geographical standpoint, sub-divided, if possible, into subjects: for the field is so vast and the amount of literature so varied and complex that any mere author-bibliography would nowadays be practically useless.

Bibliographies of the British Empire as a whole are a comparatively late invention, and indeed in many early catalogues even the heading British Empire is conspicuous from its absence; for there were few books dealing with the empire and no libraries exclusively devoted to this all-embracing subject. It was only when the first empire library was established—apart, of course, from that of the Colonial Office—and the Library of the Royal Colonial Institute, now the Royal Empire Society, commenced to grow, that the need for an empire bibliography became apparent. Even at the present day there are only two substantial non-official libraries devoted exclusively to the British Empire—those of the Royal Empire Society, containing over 230,000 books and pamphlets, and of the Rhodes House at Oxford. The first bibliography of the British Empire as a whole did not appear until 1881 when the first catalogue of the Royal Colonial Institute was issued as a small volume of 29 pages containing the principal books and pamphlets which up to that period had been issued on the British Empire and its component parts. In this work Mr. J. R. Boosé was a pioneer and in 1895 and 1901 he was responsible for two substantial volumes that may be regarded as the incunabula of British Empire bibliographies. In the meantime literature has so enormously increased and the idea of what is essential in a good bibliography has been so greatly extended, that the latest catalogue of the Royal Empire Society, of which three volumes have already been published, will consist of four volumes containing at least 3,200 pages, compared with the 29 pages of the year 1881. Of the methods employed in this latest bibliography I will speak later. At present I will only state that a work on so large a scale must necessarily embody what may be regarded as many separate bibliographies. This may be illustrated by one section alone, that relating to Cyprus, which contains practically everything that has been written on that island in any language, including the local Greek, up to the formation of this special section of the Library.

Whilst comparatively little has been achieved in the broad field of empire bibliography as a whole, with the exception of the before-mentioned catalogues and that of the Colonial Office Library, a great deal has been accomplished in the way of what may be termed national or local bibliographies in the overseas portions of the empire, and it is precisely here that the field of investigation is so large and constantly extending. An active American printer, Mr. D. C. McMurtrie, of Chicago, has recently been occupied in a study of the first products of

the printing press in each part of the British Empire and has issued the results of his inquiries in a series of interesting pamphlets. Historically they are of great interest, for they demonstrate that the press has been very active in the colonies and dependencies of the empire at comparatively early periods in the history of each colony. Thus publications were being printed in Grenada as early as 1789, in Dominica in 1765, in Bermuda in 1772, in New South Wales in 1795, in Ceylon in 1737, in Nova Scotia in 1752, in Quebec in 1759, and in South Africa in 1799.

As the production of books must precede the publication of bibliographies it is perhaps surprising to find that one of the first bibliographies of Canada was issued as long ago as 1837, when Georges Barthélemi Faribault printed his "Catalogue d'ouvrages sur l'histoire de l'Amérique et en particulier sur celle du Canada" [207 pp. *Quebec*], to be followed shortly after by François Bibaud with his "Bibliothèque canadienne" [52 pp. *Montreal*. 1858]. In fact the Dominion of Canada has been particularly fortunate in the bibliographical work done there, for not only did Henry James Morgan publish an extensive bibliography in 1867 [*Bibliotheca canadiensis*. 411 pp. *Ottawa*] but he was followed by Philéas Gagnon who had all the flair of the born bibliographer, and issued his "Essai de bibliographie canadienne" in two volumes [*Montreal and Quebec*] in the years 1895 and 1913; and by Narcisse Eutrope Dionne, Librarian of the Legislative Library at Quebec, the bibliographer in excelsis of the Dominion. Dr. Dionne's bibliographical works were issued under the auspices of the Royal Society of Canada in four separate parts in the years 1905-11 and although they deal mainly with the province of Quebec they form the most important epitome of books published in Canada and relating to Canada that has yet been published.* In addition there are Père Hugolin's "Bibliographie franciscaine" [143 pp. *Quebec*. 1916], J. S. Porteous' "Canadiana in the Douglas library" [87 pp. *Kingston*. 1932], F. J. Turner's "List of references on the history of the West" [133 pp. *Cambridge*. 1915], D. D. Tod's and A. Cardingly's "Bibliography of Canadian literary periodicals" [*Can. R. Soc.*, pp. 87-96. 1932], and many other works. In fact, so extensive is the bibliography of Canada that the McGill University published in 1930 a "Bibliography of Canadian bibliographies" [45 pp. *Montreal*] as a guide to the work already achieved. Canada, too, has been particularly fortunate in possessing an annual publication, first inspired, I think, by Professor George Wrong of Toronto, commenced in 1897 as "Review of historical publications relating to Canada" and now called the "Canadian Historical Review," which contains practically everything of importance issued in the historical field including books, pamphlets, and even articles, and the "Canadian catalogue of books published in Canada" issued annually by the Toronto Public Library.

Apart from the Dominion as a whole, however, there are the

* *Inventaire chronologique des livres, brochures, journaux, et revues, publiés dans la province de Québec, 1764-1904.* 175 pp. 1905.

Ditto, des ouvrages publiés à l'étranger sur la Nouvelle France et sur la province de Québec, 1534-1906. 155 pp. 1905.

Ditto, publiés en langue anglaise dans la province de Québec, 1764-1906. 249 pp. 1906.

Ditto, publiés dans et hors de la province de Québec, 1904-1911. 75 pp. 1911.

purely local bibliographies to be considered. Quebec, which in the early days is almost identical with Canada itself, has already been noticed, but there are also the bibliography of Ontario by the Canadian historian William Kingsford [Early bibliography of the Province of Ontario. 140 pp. *Toronto*. 1892], W. G. MacFarlane's "New Brunswick bibliography" [98 pp. *St. John*. 1895], and C. W. Smith's "Pacific Northwest Americana" [309 pp. *New York*. 1921] which covers the sea-board territories of the United States and Canada; and outside Canada, in the neighbouring Newfoundland, both Daniel Prowse, the historian of the island, and R. Perret have done bibliographical work. The subject of archives does not come within the scope of this paper, but it should be mentioned that the Canadian Archives Department has issued some excellent guides to its documents and maps and that Magdalen Casey published in 1931-32 a "Catalogue des Brocheurs aux Archives Publiques" in two volumes.

Turning to Australia and New Zealand, bibliographical work is necessarily of a somewhat different character. The continent of Australia has neither a very interesting nor extensive historical literature. There has been no clash of arms on the island-continent with its accompanying political problems; the native races have been comparatively easy to manage; and political and economic growth has been comparatively slow. To the outsider, therefore, its historical literature lacks the interest of the more vivid and active literature of British North America, though in the realm of imaginative literature there is an active and progressive local school sufficiently characteristic to merit close attention. In the neighbouring Dominion of New Zealand native wars have produced an abundant crop of historical and political books and pamphlets which, considered in connection with the wider field of maritime discovery in the South Pacific, present a literature of no little interest. Bibliographical work in connection with the Commonwealth may be said to have commenced with Dr. W. H. Bleek's catalogue of that portion of the Grey Library at Capetown containing works on the Australian native races and languages. Dr. Bleek, the Librarian of the Grey Library, was as noted as a philologist as Sir George Grey was celebrated as a statesman and book-collector. Consequently this early catalogue is of great value to the student of the Australian natives. From 1887-92 Mr. Petherick, then a book-seller in London and afterwards Archivist to the Federal Parliament, issued a periodical called the "Torch and Colonial book collector"; but it was not until 1893 that the first notable Australian bibliography was published by the New South Wales Public Library as the "Australasian bibliography." This was really a catalogue of that library, in three parts, which was subsequently extended by seven other parts published between the years 1895 and 1912. In 1925, P. Searle issued his "Bibliography of Australian poetry and verse" and in 1928 the New South Wales Public Library published a bibliography of Captain James Cook; but apart from these two works Australian bibliography as a whole has not been of a high order. In the States, bibliographies of South Australia [Gill, T. Bibliography of South Australia. 118 pp. *Adelaide*. 1886], Western Australia [Steere, F. G. Bibliography of Western Australia. 172, xi pp. *Perth*. 1923], and Queensland [O'Donovan, D. Analytical and classified catalogue of the Library of the Parliament of Queensland. viii, 925 pp.

Brisbane. 1883. *Ditto*, 3v. *Brisbane*. 1899-1900] have been published, the last being a general catalogue not confined to the State.

In New Zealand bibliographical work has been particularly good. It commences with the catalogue of that portion of the Grey Library relating to New Zealand, published in 1858-59, and has been rendered specially notable by Dr. T. M. Hocken's careful analytical work [Bibliography of the literature relating to New Zealand. xii, 619 pp. *Wellington*], published in 1909, which is one of the best guides to a national literature. Other notable contributions are the "General catalogue of the Grey collection in the Auckland Library" [663 pp. *Auckland*. 1888], J. Collier's "Literature relating to New Zealand" [235 pp. *Wellington*. 1889], W. H. Trimble's "Catalogue of the Hocken library" [516 pp. *Dunedin*. 1912], the "Bibliography of printed Maori," by W. H. Williams [xvi, 198 pp. *Wellington*. 1924], and A. H. Johnstone's "Supplement to Hocken's bibliography" [73 pp. *Auckland*. 1927]. The catalogue of the General Assembly Library at *Wellington* [2v. *Wellington*. 1897] is of a general nature.

In the Union of South Africa there is one notable work, the late Sydney Mendelssohn's "South African bibliography" [2v. 1910] which is a monumental guide to South African literature. Although there are many faults both in arrangement and style it ranks easily as the best bibliographical guide to a national literature in the overseas British Empire, owing largely to the copious annotations introduced by its author. The catalogue of the Grey Library by Dr. W. H. Bleek [1858] is the earliest bibliography of South African interest, but the long and stormy history of the sub-continent has provided ample material for subsequent bibliographical work, such as T. Hahn's "Index to the Grey Collection in the South African Public Library" [404 pp. *Capetown*. 1884], Evans Lewin's Catalogue of the Port Elizabeth Library" [2v. 1906] and Dr. G. M. Theal's "Catalogue of books and pamphlets relating to South Africa," in his own collection [408 pp. *Capetown*. 1913]. The Parliamentary library of South Africa issued in 1931 a list of books in Afrikaans and just before it was burnt down the Library of the Witwatersrand University commenced a periodical list of its Africana.

In the Crown Colonies recent bibliographical work includes the valuable contributions to West Indian bibliography compiled by Frank Cundall, Librarian of the Institute of Jamaica [Catalogue of the books in the library of the Institute of Jamaica. viii, 351 pp. *Kingston*. 1895; Bibliography of the West Indies, excluding Jamaica. 179 pp. *Kingston*. 1909; Bibliographia Jamaicensis. 83 pp. *Kingston*. 1902; and supplement to *ditto*. 38 pp. *Kingston*. 1908], the very competent, from a bibliographical point of view, "List of works relating to the West Indies," issued by the New York Public Library in 1912 [392 pp.], Professor L. J. Ragatz's check lists of House of Commons and House of Lords sessional papers relating to the West Indies, and his valuable "Guide for the study of British Caribbean history" [viii, 725 pp. *Wash.* 1932], Sir H. C. Luke's "Bibliography of Sierra Leone" [230 pp. *Oxford*. 1925], A. W. Cardinal's "Bibliography of the Gold Coast" [384 pp. *Accra*. 1932], and Claude Delaval Cobham's various bibliographies of his extremely valuable collection of books on Cyprus which is now in the Library of the Royal Empire Society.

In the wider sphere of the empire as a whole recent work has included bibliographies on the constitution, communications and transport, relations with native races, etc., issued by the Royal Empire Society; certain bibliographical guides published by the Historical Association; a bibliography of publications issued since 1900 on the history of the British Empire, prepared for the Congrès International et Colonial by Evans Lewin and Miss Winifred Hill, and Miss Winifred Hill's bibliographical guide to the "Overseas Empire in Fiction" [66 pp. 1930]. Mention must also be made of the excellent guide to Parliamentary Papers relating to the Dominions [Adam, M. I., Ewing, J., and Munro, J. 190 pp. 1913] and the "Catalogue of Parliamentary Papers, 1801-1900" [vii, 371 pp.].

It is desirable to examine briefly the characteristics of some of these bibliographies. Paradoxical as it may seem the last thing that the bibliographer should consider is the bibliographer himself. He must determine first what is to be the main purpose of his work, and having decided that, he must consider how much or how little is to be included to make the bibliography of the greatest use to those for whom it is primarily intended.

Everything will depend upon his decision—actual form, subject, author, or chronological arrangement, and within the first the interlacing arrangement of subjects, whether by geographical or purely subject headings or a combination of both, and then again whether the entries should be arranged by alphabetical or chronological order under the subjects; and the use of extensions to the purely bibliographical part of the entries by means of annotations or other extraneous matter. If it be decided that the catalogue is primarily for the use of the student and inquirer working on a particular subject or country and not for the bibliographer or book-collector, a host of problems immediately arise in connection with type, arrangement, and other matters that can only be determined by the length of the official purse. The entries may be long, medium, or short, or a judicious mixture of all three, according to the value of the book to the student or the necessity for making its subject clear to the enquirer. In fact, the bibliographer, although necessarily bound by rules as to the actual form of an entry, if his work is to reach the highest standard—that is, to be of the greatest use to those for whom it is intended—should be bound in no other respect, so that he can use his own judgment in every specific case. Rules, except as to form, are made to be broken and the more often they are intelligently broken the more valuable will be the work of the bibliographer.

I do not intend to criticise the work of other bibliographers, but there appear to me to be two essentials for any good catalogue that have too often been disregarded in the past. The number of pages, and the place of publication should always be given. In addition, it is a counsel of perfection to use the full name of the author. In the case of the catalogue of the Royal Empire Society these necessary particulars are included, and I have gone a step further by indicating the dates of the birth and death of authors, the names of offices they have held (which frequently indicate their authority to write on a special subject) and the dates of first editions. The arrangement of this catalogue, which may perhaps be compared with that of the London School of Economics as a monumental work, is geographical. These main

geographical sections are again sub-divided into as many subjects as thought desirable in each special case, and the entries are arranged chronologically in their divisions, with a special author-index at the end of each volume. Thus in the case of the Dominion of Canada, 444 different subject-headings have been used, excluding the numerous geographical headings and reference headings. Nor only are all books and pamphlets included but also papers and official literature of all kinds, the contents of special books and reports, magazine and review articles, and the contents of the proceedings of learned societies. The whole forms, therefore, not only a bibliography of the overseas empire, but also of each specific part thereof, each section following the other in a rational geographic sequence. Thus the first volume covers the British Empire as a whole and the continent of Africa from North to South specifically. The second covers Australia, New Zealand, the South Pacific, and maritime voyages and travels. The third relates to the Dominion of Canada, Newfoundland, the West Indies, and the colonial history of America; while the fourth will cover the sea-road to the East and will include the Mediterranean colonies, the middle East, India and Ceylon, British Malaya and the far Eastern possessions. This is, I think, a satisfactory and logical arrangement.

I need only refer to two or three other outstanding bibliographies that have already been mentioned because they illustrate different methods of compilation. The Mendelssohn bibliography of South Africa is in the main an author-catalogue, but its general scope is so admirable that it is of great value to the inquirer who knows his author rather than his subject. There is, however, a subject-index, not sufficiently extensive for so important a work—so that the method employed in the Royal Empire Society's catalogue is actually reversed. This bibliography was the work of a book-collector rather than of a librarian with a knowledge of the requirements of students, and the same criticism applies generally to Hocken's bibliography of New Zealand which has only a small subject-index, to Dionne's Canadian bibliographies, which are chronologically arranged, with author indexes, to Gagnon's bibliography of Canada, which is an author catalogue only, and to the Australasian bibliography which is an arrangement of authors under the names of the different States. Cost of production is always a deterrent with regard to bibliographies and no catalogue has ever been produced, so far as I am aware, which is at the same time a complete and full author and subject bibliography. It is not too much to expect, however, that the slipshod bibliographical work that unfortunately is still produced—especially when the pagination of books is left out—will soon be a thing of the past. It is of no use to the student for the Librarian to produce for him a ten-page pamphlet when he requires an elaborate history or special treatise.

With respect to the future of bibliographical work in connection with the overseas British Empire I have high hopes. The output of literature, official and otherwise, is so immense that in sheer self-defence it will be necessary to devise some means for the co-ordination of bibliographical work through the agency of an annual or periodical bibliography of what may be termed empire publications. At the present time there is no means of knowing in one part of the empire

what is being written or prepared in another, unless it happens to be published in the United Kingdom. The output of books and pamphlets in Canada is very large ; it is considerable in Australia ; it is growing in South Africa. In India, which is a country *sui generis*, the output is immense if the vernacular literature be also considered ; but I have purposely excluded the Indian Empire as that would require an annual bibliography to itself. The great catalogue of the Imperial Library at Calcutta, of which eight volumes were published between 1904-10 and the "Index-catalogue of Indian official publications in the British Museum Library" illustrate sufficiently that fact.

There are three suggestions that I would put forward for the attention of those who have the administration of funds that can be used for educational purposes.

The first is that there should be published periodically a bibliography of all the official literature issued in the various parts of the Empire. For five years I prepared and issued a quarterly bulletin of "Overseas Official Publications," which was the only co-ordinating list of these extremely valuable publications. The financial support, however, was insufficient to warrant the continuance of a bibliography that should have been taken not only in every considerable library, university or otherwise, but in every government office in the British Empire, as it should be invaluable to the student, the government official, and the administrator.

The second suggestion is a plea for an annual bibliography, annotated if possible, of all empire publications.

The third is connected with post graduate work on any part of the British Empire undertaken in the universities of the United Kingdom, The Dominions, and the United States of America. At the present time an enormous amount of first rate work [and incidentally, much work of an inferior quality] is being done. Some of it is printed, although in the case of much of it typescript copies only are in existence. The co-ordination of this work by means of an annual printed list is urgently required. I have already taken preliminary steps to find out how much work of this character is being done and on this point I need only refer to my report on this subject, printed in the July issue of "United Empire," and to the list of such theses which was prepared in connection with the Report. Unfortunately the latter is necessarily a confidential document, but it demonstrates that in this field alone there is being produced a mass of material of great use to the student of history and economics, and it shows the really lively interest in these aspects of the British Empire that is displayed not only in our own universities but also, to a very large degree, in the universities of America.

At the beginning of this paper, I stated that I should discuss what are the essentials of a good bibliography ; but I think it only necessary here to emphasise four important points. The first is that the bibliography should be, if possible, a subject one with an adequate author-index. The arrangement and choice of subjects depends upon the purpose the bibliography is designed to serve. The second is that the majority of the entries should, so far as possible, be bibliographically correct, with all necessary enlargements and annotations to explain the scope of a particular work when that is not clear from its title. In the case of books, pamphlets, and material of that nature, the

title should not be changed, although it may be shortened. Thus the title should never be translated into English, as is sometimes done, as it is to be presumed that anyone reading the book would also be able to understand the title. In the case of official papers the titles may be changed to meet the requirements of each particular case, as the title differs from time to time and frequently in various parts of the same document. Numbers, however, should always be quoted when they appear on an official document. The third point is that bound or unbound books are not the only form of literature, and sometimes not the most valuable to the student. All kinds of material bearing upon a specific subject, therefore, should be included if the bibliography is to fulfil its high purpose. The fourth point is that form, type, and paper, should be good; for a bibliography may have to last for generations, and cheap and nasty production is a serious drawback to its continued and ultimate utility.

NOTE.

Owing to lack of time, a discussion on Mr. Lewin's paper was not possible. A comment upon it by the CHAIRMAN, DR. S. C. BRADFORD, can be seen by members on application to the office of the Association.

Market Research.

By S. P. DOBBS.

If I had been reading a paper on Market Research before this Association as recently as ten years ago, I should probably have begun on a note of apology. At that time the ordinary intelligent person with an interest in commerce was inclined to regard market research, along with "high pressure salesmanship" and other transatlantic innovations, as being unworthy of his serious attention. To-day the substitution, wherever possible, of exact knowledge of markets for random guesswork has ceased to be a novelty, and the importance of studying his customers from a research point of view is taken for granted by every alert sales manager. I shall not therefore waste any time in pleading the case for market research, but at once proceed to describe from my own experience what it involves in practice. In doing so, I shall be addressing my remarks mainly to those of you whose daily duties do not bring you into direct contact, except as purchasers, with the distribution of goods or services. If, as I suspect, there are many here of whom this is not true, I must crave their indulgence for taking them over familiar ground. Later in the paper I shall endeavour to enlist their interest also by dealing in some detail with the principal published sources of information which my own firm has found useful for market research purposes, and to indicate some of the gaps in these sources which seem most urgently to need filling.

THE SCOPE OF MARKET RESEARCH.

Most of us realise in a general way what is implied by Market Research, and an attempt to define its meaning with any exactitude is therefore unnecessary. Its function, as a colleague of mine has remarked, is to provide the facts upon which to build a merchandising and marketing policy. It thus covers all those methods of estimating the existing or potential demand for a commodity, and of assessing current changes in public taste which rest on something more solid than guesswork and what business men know as "the feel of the market." The sphere in which it has hitherto been most successfully applied has been the distribution through the wholesale and retail trade of branded merchandise intended for the use of the general public. My own experience has been entirely in this sphere. But it must not be forgotten that similar methods—and particularly a similar mental approach—are applicable to almost every type of commercial activity.

I will quote two examples to illustrate my point. The first concerns a distributor of motor tyres and accessories who was not satisfied with the sales of his products in a particular town, although the number of his depots appeared to be sufficient and their locations were all in or near important thoroughfares. Having failed to obtain any useful suggestions from the members of his staff, he called in the assistance of an experienced investigator who had a practical and

theoretical knowledge of statistical methods. This investigator began by marking on a large-scale map of the town the exact location of each of the manufacturer's distribution depots, as well as of those belonging to his leading competitors, together with the position of the principal hotels, railway stations, department stores, car-parks and other places which might have some influence on the amount of motor traffic in their neighbourhood. A careful study of this map, in conjunction with detailed sales figures for each depot, led him to recommend an alteration in the position of nearly every depot, and the adoption of his recommendations as opportunity offered has been followed by a gratifying improvement in the volume of the manufacturer's sales. The second case I have in mind is that of a line of river steamers in Canada, catering principally for summer tourists and owning a number of hotels at the principal ports of call. The same investigator was asked to make a report on the services which the company was offering to the public and to suggest methods of attracting a greater number of patrons. By dint of personal observation, supplemented by the answers to a questionnaire issued to some of the passengers, he was able to make a number of valuable suggestions which the company adopted.

Neither of these enquiries involved any extensive use of published information, which is presumably the aspect of market research specially interesting to members of ASLIB, but they are quoted to show the wide range of problems with which the consultant may be called upon to deal. If in the remainder of this paper I look at things mainly from the point of view of the manufacturer of branded goods in wide popular demand, it is because this is the only angle of the commercial field with which I am personally familiar.

There is one further preliminary point. In certain cases, particularly where a firm is very small or has had no previous experience of modern methods of market investigation, it may be desirable to call in the assistance of an external investigator. But in general it will pay the manufacturer to establish permanent machinery of his own to carry out market research. Only in this manner is it possible for the person responsible for the work of investigation to follow his recommendations through to the end and to see that they are properly applied to the determination of policy.

SOURCES OF INFORMATION.

First and foremost among the sources of information which are open to the investigator come the firm's own records of past sales. A large part of Market Research consists in the skilful handling of these records (which in any case have to be kept for the purpose of controlling factory production and stocks of raw material), so as to extract from them the maximum of information about the trend of the market. By means of charts showing the movements of the seasonally corrected sales of individual products and groups of products, which are kept constantly up-to-date and continuously examined, changes in the trend of public demand can be detected at any early date, and sales in the immediate future forecast with some degree of accuracy. The effects of a change in price, or of an advertising campaign or of some alteration in the product itself can be

closely watched and valuable deductions can be drawn by comparing them with the effects of similar events in the past.

Equally important are the figures showing the variations in sales between one area and another. My own firm has split the country up into a large number of small areas, for each of which the population can be calculated annually from the Registrar-General's reports. These areas are in turn grouped into a smaller number of economic regions, and monthly sales figures for each area, and in greater detail for each region, are recorded and examined. Maps are prepared each year, or each quarter, showing where sales have increased and where they have fallen off, with an indication by means of a graded system of colouring of the magnitude of the increase or decrease. These are examined in the light not only of our own special activities, such as a change in the number of our representatives or a local advertising campaign, but also of the general state of business revealed by the published information which will be discussed later. A good deal of this work is of a routine nature, but special figures are frequently taken out to assist in the solution of special problems, and new ideas frequently suggest themselves from what may have been a purely routine examination of a map or a chart.

A second source of information is the general public. Before deciding to market a new chocolate which has won the preliminary approval of our factory tasting panel, we want some indication of how it will appeal to the ordinary consumer. We also want to know how our existing chocolates and assortments compare with those sold by our competitors at the same price. For this purpose we have compiled a list of ordinary consumers living in different parts of the country, to whom we periodically send a number of chocolates each wrapped in tissue paper with a key letter on it but with no other means of identification. Accompanying the chocolates is a voting paper on which the taster is asked to record the number of marks which he or she thinks each unit deserves, and to make any comments which may occur to him. One of our most popular recent introductions, Chosen Chocolates, was based entirely on the results of a series of these tests, the units being selected from a very large number by a process of elimination. A similar technique is of assistance in such matters as the selection of the most popular colours for boxes and wrappings, and can, of course, be applied by the manufacturer of almost any article to guide him in its design.

Another method of ascertaining the views of the consumer is by means of a sample door-to-door enquiry in selected districts. This is often a useful means of finding out the relative standing in the public mind of different brands of an article, and is best undertaken by a specially trained staff employed by an outside organisation—usually the manufacturer's advertising agent. The districts to be visited and the form of the questionnaire will, of course, be decided on by the manufacturer's research department in collaboration with the agent, but it is a positive advantage that the actual field work should be done by outsiders, who need not even know the identity of the firm on whose behalf they are working. Such enquiries are usually expensive if they are conducted on a sufficiently large scale to yield trustworthy guidance, but for certain purposes they are of great value.

The third source from which a knowledge of the market can be obtained is the one on which until recent years the average manufacturer almost entirely relied—namely, the views of his wholesale and retail customers, which were usually conveyed to him through his travelling representatives. The reports which come in regularly from the travellers remain, of course, of very great value, particularly in regard to such questions as the acceptability of terms of sales, rates of discount, profit margins, and so forth, as well as in regard to the activities and standing of rival manufacturers. We ourselves not only make the fullest use we can of such reports, but occasionally send out to certain of our representatives special questionnaires relating to points on which we particularly want information. But the commercial traveller is almost bound by his vocation to be biased, and for this reason we occasionally find it desirable to send out a special investigator to interview representative dealers. If, as may often happen, it is important to preserve anonymity, the investigation is best carried out by an external agency on the lines described in the previous paragraph. This procedure has the further advantage that the specialised agency will have a wide experience of similar investigations in the past and will therefore be in a good position to choose the most suitable towns and individual traders to be visited. When a firm is proposing to enter an entirely new market, or to manufacture a type of product with which it has had no previous experience, a preliminary trade survey of this kind will furnish invaluable information about the nature and extent of the competition which will have to be faced, the best channels of distribution, the usual terms of business, and similar questions.

An instrument which some manufacturers have found of great value, but of which I have no personal experience, is the "laboratory shop," that is to say a retail shop which can be used to collect information about the consumer and his habits. To yield the best results such a shop should be indistinguishable from an ordinary independent undertaking; its connection with the manufacturer who owns it should be unknown to the general public. It is also desirable to have, say, half-a-dozen shops in different types of district, so as to ensure the representative character of the information obtained. A manufacturer so equipped would be able to find out a great deal about the classes of customers to which his different products specially appeal, which would be of considerable assistance in planning new lines. He would also be able to test the effectiveness of various types of window display material, the relative appeal of his own and his competitors' goods, the effect on turnover of stocking a large or a small number of different lines and generally to obtain a great deal of information which it would be difficult to get in any other way.

In addition to the three principal types of research so far described—the continual review of sales statistics and the organised enquiry into consumer and dealer opinion—we have found it useful to carry out a number of general surveys of the wholesale and retail distributive machinery through which our products reach the public. One matter in which we have been specially interested is the total number of retail selling points for our goods in relation to the number of retailers with whom we have direct accounts.

This could only be ascertained by direct observation and we

therefore carried out a series of investigations in eight or ten selected areas. In each of these areas the total number of shops was recorded, and those which sold confectionery were classified according to the nature of their business and divided into five grades, ranging from the high-class confectionery shop like Fullers or Maison Lyons to the dirty little house-shop in the slums. Another major investigation we have undertaken, in conjunction with the Manufacturing Confectioners' Alliance, has been into the operating expenses of the typical retail confectioner. In the course of this enquiry the books of some 150 shopkeepers who were willing to put information at our disposal were examined, and in spite of the inadequacy of many of the records we believe the conclusions reached in the investigator's report are substantially accurate. They have certainly proved extremely useful to us when questions relating to price-fixing have been under discussion. Other questions, such as the prevalence of what is known as club trading, the extent to which confectionery is sold through automatic machines, and—a matter of great interest to us—the rapid growth of the co-operative and multiple shop movements, have from time to time occupied our attention.

PUBLISHED STATISTICS.

This brings me to the last of our principal sources of information—published statistics. Properly speaking these should take precedence over the *ad hoc* field investigations organised by the manufacturer which I have just been describing. I have, however, purposely deferred their consideration to the end of my paper so as to be able to close with a discussion of their present inadequacy. Much of the general trade information which we have had to collect for ourselves is of a kind which ought to be available to all without the necessity of costly enquiries. Most of it also could be obtained with far greater efficiency, accuracy and regularity by a government department or semi-public body than by any private firm.

There are four principal fields in which the student of market conditions can reasonably expect guidance from published material. These are the general structure of the market, the relation of his firm to the whole industry, the general course of trade, and local variations in prosperity between one area and another.

As regards the general structure of the market, almost no reliable first-hand information is available apart from the *Census of Population*, which gives particulars of the numbers, age, sex, occupation, marital conditions and so forth, of the ultimate consumers in each part of the country. This is very helpful, but it needs supplementing by a Census of Distribution similar to that carried out in 1930 in the United States. It would take too long to describe in detail the wealth of information which will be made available to the American manufacturer as a result of this comprehensive survey. The reports already published provide authoritative figures showing the number of retail and wholesale establishments throughout the country, classified according to the nature of the business, the type of shop—whether department store, chain store, manufacturer's chain or unit shop—the size of turnover and the number of employees. They also provide a good deal of information about the aggregate retail sales of different groups of commodities, about retail and wholesale operating expenses,

about stocks, and about the extent of trading on credit. A further series of reports will deal in greater detail with chain store operation, as well as with a number of special questions such as the hotel and construction industries and the marketing of agricultural produce. A great deal of this information could no doubt be dispensed with in this country, but there is widespread agreement that a Census of Distribution on somewhat the same lines is needed.

In the supply of information which throws light on his position in relation to the rest of his industry the manufacturer is rather more fortunate. The most comprehensive official source is the *Census of Production*, which has been taken twice during the post-war period—in the years 1924 and 1930. By comparing his output in the Census year with the aggregate returns for the whole industry he can assess his own share of the market. The chief drawbacks to these figures are the lateness of their publication—over a year after the close of the period to which they relate—and, more serious, the long intervals which elapse between each successive Census. There is a strong case for taking an annual Census, which manufacturers would soon come to regard as a matter of routine, and which would throw valuable light on the extent to which each firm is gaining or losing ground. Another source of official information, which is open to those whose principal raw material is an imported article subject to duty—for instance cocoa—is contained in the Board of Trade monthly returns of withdrawals from bond. These are published, with commendable promptitude, about the 20th of the month succeeding that to which they refer. Where the manufactured product is itself dutiable, for instance in the case of wines and spirits, the annual production figures are published by the Commissioners of Customs and Excise. For the motor industry indications of the market position are afforded by the Ministry of Transport returns of new car registrations. Finally, the Ministry of Labour's monthly returns of employment by industries enable any manufacturer to follow the trend of employment in his own industry, and so obtain some guidance as to probable variations in output.

Apart from these official sources of information certain Trade Associations now compile indices of production on the basis figures supplied by their members. The best known of these are perhaps the figures prepared by the Electrical Trades Federation. In the chocolate and confectionery industry a number of the members of the Manufacturing Confectioners' Alliance make a quarterly return of their output to the office of the Alliance, which circulates the aggregate figures to all the firms concerned. This is a form of trade co-operation which might well be extended to a much larger number of industries than those in which it is at present practised.

Yet another index of one's competitors' progress is that afforded by their annual profit and loss accounts and balance-sheets. Until recently it was difficult to draw any very exact conclusions from these cryptic documents, but the Moody-Economist Service has at least done something to place the figures on a basis from which reliable comparisons can be drawn.

For the general state of trade there are now available a number of indices which between them provide sufficient information for the practical needs of the ordinary manufacturer. I need not enumerate

these in any detail since they will be familiar to most of the audience. They include among others the monthly unemployment returns published by the Ministry of Labour, the indices of wholesale price movements published by the Board of Trade, the *Economist*, *The Times*, and other agencies, the monthly totals of imports and exports contained in the *Trade and Navigation Accounts*, the figures showing changes in the volume of retail trade collected by the Bank of England, the figures relating to the production of coal and iron and steel published by the Board of Trade and the Iron and Steel Manufacturers' Federation respectively, together with such financial indicators as the volume of bank clearings, the volume of new capital issues and movements in the Bank Rate. These figures are reproduced and interpreted in the *Bulletins* issued by the London-Cambridge Economic Service and in the monthly supplements to the *Economist*; these two publications between them provide a reasonably satisfactory background against which each manufacturer can measure his own achievements.

Finally we come to the question of local variations in the capacity of the market; this is of the very greatest interest to the manufacturer who undertakes his own distribution. Two separate issues are really involved. There is, first, the problem of assessing the purchasing power per head of population of one region as compared with that of another. Bethnal Green is obviously poorer than Kensington, and Merthyr Tydfil than Bournemouth. How far is it possible to establish a quantitative measure of differences of this kind, against which a manufacturer can set the corresponding differences in his own sales per head? The second problem is that of measuring the local fluctuations of business activity in each area from month to month—that is of constructing a series of indices of regional prosperity.

For comparing one area with another perhaps the most generally useful information is that contained in the *Census of Population*. The Occupational Tables, together with the figures showing the distribution of persons per room in each district, give a rough indication of the extent to which the district is working-class, middle-class, or well-to-do. Some guidance is also afforded by the aggregate figures of rateable value issued by the Local Authorities, though these are not always very reliable for comparative purposes. Certain other statistics, including the Ministry of Transport's *Annual Census of Motor Vehicles* and the numbers of private telephones in each area, are sometimes quoted as being helpful for the purpose of estimating local prosperity, but it is difficult to see how they can be put to effective use. What is really required is an authoritative index, prepared by a government department, comparing the aggregate purchasing power of the people living in the different areas. The basis of such an index would be the information relating to employment and wages in the possession of the Ministry of Labour, and the Income Tax Returns in the hands of the Board of Inland Revenue. It is high time that the obsolete tradition of secrecy in respect of these returns should be so far discarded as to allow them to be used for the purpose I am suggesting. They have, in fact, been so used from time to time to provide information for official Commissions and Committees, but hitherto all attempts to secure regular informa-

tion about the aggregate taxable income in different parts of the country have been resisted. Practical difficulties no doubt exist and would have to be surmounted before the required particulars could be prepared, but such difficulties should not be allowed to stand in the way when the public interest demands that they should be overcome.

For measuring business fluctuations within each region, by far the most useful source of information at present available is provided by the Ministry of Labour's Unemployment returns, particularly in the form of the Special Subscription Service which gives the percentage of unemployed in every county and in 700 of the larger towns in Great Britain. These figures alone are a very fair indication of the ebb and flow of business activity in the industrial areas, but they are less useful in rural districts, where the staple occupation, agriculture, is outside the present scope of Unemployment Insurance, and almost worthless in London where a large part of the population consists of clerical and administrative workers, many of whom are outside the income-limit for Unemployment Insurance, many of whom remain in employment irrespectively of day-to-day fluctuations in business activity and many of whom live in one district and work in another. Additional information regarding local prosperity is obtainable from the weekly figures of Bankers' Clearings in each of the twelve provincial Clearing Houses, from figures relating to production and trade and to wage-changes for industries which are highly localised, notably for the Cotton Industry of Lancashire, from the Board of Trade Shipping Accounts which are useful for the large ports, and from a number of local sources for individual districts. A very valuable supplement to the information available in statistical form is provided by the Monthly Bulletins issued by the Midland, Westminster, Lloyds' and Barclays' Banks, which contain reports of actual business conditions up and down the country.

The most recently established index of local buying power is that compiled by the Incorporated Association of Retail Distributors and issued by the Bank of England. This shows the monthly variations in the aggregate turnover of a limited number of department stores, multiple shops, and co-operative societies in Central London, Suburban London, the South of England, Wales and the North of England, and Scotland. Unfortunately the areas are too large, and the number of shops reporting their turnover far too small, for the index to be of much use for market research purposes. A really comprehensive index on these lines, based on information from representative groups of department stores, multiples, co-operatives, and independent shops in each of a dozen or more areas would obviously be of first-rate value—but it would be difficult under present conditions to compile. It would probably be easier to collect regular returns of their sales in agreed buying areas from a large group of representative national manufacturers, from which the movements in the total volume of sales in each area could be calculated and published. Proposals for such a service, which could be undertaken by some national body of recognised impartiality, such as the Bank of England or the London-Cambridge Economic Service, have been made from more than one quarter in recent years. Unfortunately it has not yet been possible to arouse sufficient interest among manufacturers to translate these proposals into practice.

To sum up. There is now a large mass of published information, varying widely in reliability and completeness, to help the market investigator in his work. During the past decade much progress has been made in dispelling indifference and breaking down obsolete notions of secrecy. But much yet remains to be done before the alert manufacturer can rest content. The most urgent needs at the moment are a Census of Distribution like that which has been carried out in the United States, an annual instead of a quinquennial Census of Production, an index of Regional Buying Power based on information in the hands of the Ministry of Labour and the Board of Inland Revenue, and a Regional Sales Index to be compiled from returns sent in by a large number of national manufacturers. The satisfaction of these needs will not prevent manufacturers from adopting mistaken marketing policies, but it will at least enable them to act in the light of a full knowledge of market conditions. Knowledge is no substitute for wisdom, but it is an essential preliminary to wise decisions.

NOTE.

The chairman at this session was MR. ERNEST WALLS, who agreed with the speaker on the necessity for access to basic data and for the co-ordination of those statistics of trades and occupations which are now collected by the Government. Notes contributed by the CHAIRMAN can be seen by members on application to the office of the Association. Speakers in the discussion included MR. A. B. BLAKE, MR. J. C. HOSKEN, PROFESSOR R. S. HUTTON, COUNCILLOR F. W. TOOKEY, and MAJOR G. B. ATHOE.

Air Survey Work :

Its Various Aspects and Uses.

By H. HEMMING, A.F.C., F.R.G.S., A.F.R.Ae.S.

As this paper was circulated beforehand to the members of the Association the author did not read it at the Conference but confined himself to describing and showing a number of lantern slides and photographs, in order to illustrate the paper.

As the title implies, the subject was dealt with in two parts as follows :

PART ONE.

AIR SURVEY WORK.

1. MEANING OF TERM—AIR SURVEY.

In the following paper the term Air Survey is used to describe those activities of surveying, prospecting, or other forms of economic development in which air photographs are used to assist in the work.

Successful air surveys can only be made through the geologist, ecologist, ground surveyor, and other experts concerned, working in perfect co-operation. For mapping purposes it is the ground surveyor who interprets the detail on the photographs and transfers it to map form, he also provides the necessary control on which the air survey is built up. For geological prospecting it is the geologist who uses the air photographs to assist him in his investigations on the ground, and so with the other experts.

The airman's job is to provide the photographs, and as these photographs must be very accurately taken if they are to be of value, the air surveyor must be as fully qualified an expert in his job as are the other ground experts with whom he is working.

In the past a survey was usually made for mapping purposes only, now the introduction of air photography to mapping, not only provides the surveyor with a wealth of topographical detail rapidly and cheaply, but also yields information relating to the economic resources of the territory photographed, as will be explained later on in this paper.

The aeroplane provides a vehicle whereby the ground surveyor and other experts concerned, may extend their vision, through the medium of the air camera, to areas previously inaccessible to them, except at a prohibitive expenditure of time, labour and money.

2. HOW AN AIR SURVEY IS MADE.

It is not the purpose of this paper to describe the exact technique followed in making air surveys. Those who require authoritative information on this subject would be well advised to read the several papers by the well-known expert Capt. M. Hotine, formerly research officer to the Air Survey Committee and also a paper under the title of "Air Survey," by Lieut. J. S. A. Salt, R.E., the present Research Officer of the Air Survey Committee, War Office, read before the

Royal Aeronautical Society on December 8, 1932. The latter is also the author of "Surveying from Air Photographs," which is No. 8 of the Professional Papers of the Air Survey Committee.

Another authority, Mr. Donald Gill, deals with a different aspect of the subject in his paper "Aerial Survey in Relation to Economic Geology," which he read before the Institution of Mining and Metallurgy last year. Mr. Gill's paper includes a most comprehensive bibliography in which particulars are given of a number of papers and articles on the subject.

For precise work, aircraft specially designed or adapted for air surveying work are used, in which are installed special air cameras controlled and operated electrically, as well as other special instruments.

The type of aeroplane and of camera is described as follows :

(a) AEROPLANE.

The aeroplane should as far as possible comply with the following conditions :

(i) *View.* The Pilot should have an uninterrupted view forwards and downwards to the vertical, and on each side of his cockpit through a horizontal angle of 180 degrees. His instruments relating to course, speed, height, levels, and altitude should be grouped near his normal line of sight.

(ii) *Stability.* The maximum aerodynamical stability is required in order to secure accurate flying.

(iii) *Performance.* For surveys of large areas a multi-engined aeroplane is desirable, which can maintain level height with one or more of its engines "cut out." A ceiling of some 20,000 feet is required with a reasonably rapid rate of climb.

(iv) *Comfort.* In order to ensure accurate flying and photography the maximum of comfort should be provided for the pilot and photographer, and they must be able to consult with each other in the air. This implies easy access for the photographer to the pilot's cockpit.

(b) CAMERA.

Special cameras designed and built for air photography are used. The type which has been used with marked success in several large air surveys carried out by British interests, is operated electrically.

The camera mechanism used for winding the film after each exposure and resetting the shutter is driven by a small electric motor. The intervals between exposures are controlled by the setting of an Intervalometer located on the Electric Control which also contains the switch and the dial recording the number of exposures.

Films in lengths of 100 to 200 exposures, according to the size of camera, are carried in metal magazines which may be changed in the air.

By an arrangement of lights and small lenses the image of an instrument panel located in the body of the camera is photographed on the margin of each negative, each time an exposure is made. The panel contains the following instruments (1) a watch giving the time at which the exposure was made (2) an altimeter giving the height at time of exposure (3) a click recorder giving the number of the exposure (4) cross levels giving the fore and aft and lateral position

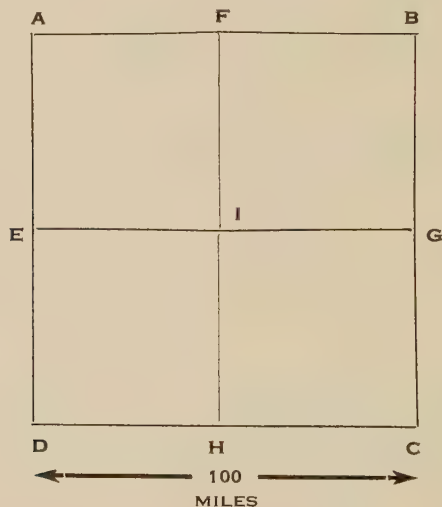
of the bubbles and (5) a small ivorine tablet on which may be written relative data such as the focal length of the lens and the type of filter used, etc.

The camera is set to give exposures at the intervals of time desired and will continue to work automatically in the air until the electric current is switched off. Other special apparatus and instruments are used, but time does not permit of their being dealt with in this paper.

(c) TYPES OF AIR PHOTOGRAPHS.

Two types of photographs are used in air surveying—*viz.*, the vertical and the oblique. The former is taken with the axis of the lens pointing downwards as near to the vertical as possible. This type of photograph is necessary for large and medium scale surveys and for surveys in hilly country.

(i) *Vertical Photography.* In order to illustrate the use of vertical photography for mapping purposes the following example is given of an imaginary air survey of an area covering 10,000 square miles, the boundaries of which measure 100 miles by 100 miles (see following sketch).



One method of conducting the air survey would be as follows :

The square "A B C D" is divided into four smaller squares by the lines "F H" and "E G."

Let us suppose that no maps of the area are available, but that (1) the geographical positions of points "A," "F," and "B" are known, (2) the photographs are to be taken at 15,000, (3) a lens of 7in. focal length is to be used, and (4) the negative size is 7in. by 7in.

At 15,000 feet above the earth, when using a 7in. lens the sides of a 7in. negative represent a distance of 5,000 yards on the ground.

The airmen, having ascertained the speed and direction of the wind and set the intervalometer on the electric control of the camera to the requisite time interval, start to fly from "A" to "F."

On arriving over "F" the photographer switches on the camera and the first photograph is taken, the electric motor resetting the shutter and winding the film ready for the next exposure. Five seconds before each exposure is made a red lamp lights up in front of the pilot warning him to steady on his course.

The interval between exposures depends upon the overlap required, the height of the aeroplane, the focal length of the lens, and the ground speed of the aeroplane. Overlap is usually taken at sixty per cent. in a fore and aft direction. With this overlap it is possible to examine in the stereoscope every part of the area which appears on two adjacent prints. This enables the ground to be seen standing out in perspective. By using a special mapping stereoscope equipped with optical grids, it is possible to draw in the contours on the stereo pairs. Stereo examination of air photographs is of great value for geological prospecting and economic surveying.

Taking the ground speed at ninety miles per hour, the interval between exposures under the conditions stated above would be forty-five seconds. The ground speed will of course vary on each course owing to the difference in wind direction.

The pilot continues on his course until he reaches point "F," concentrating on keeping his aeroplane on an even keel, at a steady speed, and a constant height, a feat requiring great concentration and much practice. The photographer watches the camera and ensures that it is as near to the true vertical as possible.

On reaching point "F," course is changed for "I," requiring a resetting of the intervalometer in order to adjust for the change in ground speed, and the operation is repeated until the boundary lines "A F I E A" are photographed.

After being developed and printed the photographs are handed over to the ground surveyors, who take them into the field and establish the position of certain permanent marks on the ground which are discernible on the photographs. The photographs are then mounted on a board on which is a plot of the ground control reduced to the scale required. While this is being done, the airmen will be flying and photographing the boundaries of the other squares.

Photographic reductions are then made of the control strips, which the airmen take into the air as a guide for making their "filling-in strips." In the present example let us suppose that the "filling in" strips are flown from the line "A B" to the line "D C" and that the flights are arranged so that the lines of photographs overlap each other laterally by twenty per cent., remembering of course that the photographs overlap each other in a fore and aft direction by sixty per cent. While the airmen are "filling in" square "A F I E" the ground surveyor would be fixing the control for the other squares with the aid of the boundary strips already taken. In this way each square would be "filled in" and the whole area covered.

Actually some 2,700 exposures would have to be made in order to cover the area of 10,000 square miles under the conditions stated. This would mean approximately 55 flying hours during which the photographs would be taken. To this must be added travelling flights from the base to the area and climb to altitude, and also allowances for any strips or portions of strips which might have to be re-flown and re-photographed.

The photographs may then be built up into the form of a picture map or mosaic, or the detail may be transferred as required to map form.

(ii) *Oblique Photography.* Oblique photography has been used with considerable success in mapping large areas of comparatively flat country on scales of the order of 1/250,000 in Canada and Northern Rhodesia. This system does not enable contours to be plotted, but by it most useful maps can be produced rapidly of country normally inaccessible to the ground surveyor on account of the expense and time involved in surveying by ground methods alone.

An area of 65,000 square miles was surveyed by means of air photography in Northern Rhodesia in eighteen months from the start of operations in the field. The photography was completed in three months. The ground control was laid down by the company responsible for the air survey, and consisted of astronomically fixed points approximately thirty miles apart.

As the north-east and east boundaries of the area were traversed by a railway, control strips consisting of vertical photographs were run across the area in an east-westerly direction approximately thirty miles apart, joining the railway on the eastern side.

The ground survey party then marched along the ground covered by these strips, using them to find their way. At approximately thirty mile intervals they selected detail which showed up on the photographs, the position of which they fixed astronomically, obtaining their time by wireless.

While the control strips were being fixed, the airmen traversed the area in a North and south direction, by flying on parallel grids approximately ten miles apart, taking a series of overlapping obliques so that the entire area was covered.

The control strips provided lines of photographs of close detail which could be transferred from the vertical photographs to map form. The oblique photographs were taken at an angle sufficient to include the horizon in the top of the picture.

Special grids were then constructed for the oblique photographs on the data known, *viz.*, the position of the horizon in the photograph, the angle of depression, the height above the ground, and the constants of the camera and lens.

When superimposed on the oblique photographs these grids gave the perspective view of imaginary squares drawn on the ground. The grid was then placed on the map sheet in plan form, and the detail in each square plotted in its correct position, relative to the sides of the square containing it.

Oblique photographs taken in conjunction with strips of verticals combined with visual reconnaissance, enable economic surveys to be made of large areas of country rapidly and cheaply.

3. IMPROVEMENTS FOR THE FUTURE.

Amongst several interesting improvements for the future may be mentioned :

(a) INFRA-RED PHOTOGRAPHY.

Infra-red photography should considerably extend the value of the air photograph for economic surveying in certain cases, and interesting developments in this direction are now being awaited.

(b) THE MULTI-LENS CAMERA.

A lens unit consisting of seven lenses, which are arranged with one central and the other six at the corners of a circumscribed hexagon with their axes pointing outwards at forty-five degrees is being produced.

This unit may be fitted to the camera already described. It gives seven pictures on one negative. That is, one vertical and six obliques, the margins of which overlap each other. By placing the negative in a special rectifying printer, a square picture is obtained similar to that taken with a single very wide angle lens.

Flying at 15,000 feet, this camera covers an area ten miles square, *i.e.* 100 square miles, instead of 5.6 square miles when using a single 6in. lens on a 5in. by 5in. negative. At this height the scale of the photograph is about 1/70,000.

For small scale work this multi-lens unit should enable flying to be cut down by about one-fifth, and the number of photographs to be dealt with to about one twenty-fifth.

PART II.

VARIOUS ASPECTS AND USES.

I. ADVANTAGES OF AIR SURVEY.

Survey is the foundation of all efficient progress. There are two major advantages of air survey as compared to the old established methods of ground survey, namely, the speed in execution and the greater knowledge of the ground obtained; and from these two advantages comes another of economy. The cost is comparatively low when we take into account the mass of economic information as well as the maps derived from the survey.

It is not claimed for air survey that it supersedes ground survey. It requires ground control, without which the air photographs cannot be used for mapping purposes. Also the photographs have to be interpreted on the ground in order to bring out their full economic value, and in the case of large scale surveys, to disclose mapable detail which may be hidden by trees, hedges, or shadows. Since they are a picture of the ground, they contain an immense amount of the most valuable information, which, in the hands of experts, can be used for development by almost every department of administration, trade, and engineering. It is not necessary to interpret every photograph when investigating an area. Sufficient photographs of each type of region in the area are interpreted, and then the information gained is applied to the photographs of the rest of the particular region.

A report of the Michigan "Land Economic Survey Division" gives independent evidence of the proved value of air survey and its recommendation by experts, who have been engaged for some years in the work of Economic Survey. The Report says:

"The work of the U.S. Army, and that of a number of more recently organised commercial concerns, has demonstrated the value of aerial photography for the economical, speedy and accurate mapping of regions that are both difficult and expensive to map

by ground methods. Aerial photographs of the regions not yet inventoried and mapped by the Land Economic Survey, would permit this survey to complete its work in at least one-third less time and provide a degree of accuracy in the detail of water features, improvements and cover conditions that could not be attained even by unjustifiably expensive ground methods. The picture record, in addition, has the value of being true and uninfluenced by human judgment. It is, therefore, most earnestly urged that aerial photography be used as the first step in the inventory of our developed and undeveloped natural resources in land, water, and forests."

It should be noted that this recommendation is made after two years' experience of air photography in the extensive and intensive work of the Michigan Economic Survey; and also that this Survey is being made over regions which have for long been surveyed, owned, occupied, and developed. But it has been found that this new form of economic surveying provides data which assists in fuller and more economic use of the ground, and is therefore worth all the labour and expense involved in a re-survey of areas, which for generations past were thought to be quite sufficiently surveyed and mapped.

Practical experience supports the chief claim put forward for air photography, that it combines in a single operation means of obtaining information on a variety of economic aspects, some of which are enumerated below :

(A) The means of providing detailed maps on a variety of scales to suit the needs of every department of State.

(B) From the photographs can be derived information in sufficient detail to serve as the basis for the production of geological maps.

(C) In many cases they indicate localities in which mineralisation is likely to occur, and where faultings and contacts exist which are not obvious to the geologist working on the ground.

(D) The zones in which, as a whole, soil conditions are exceptionally favourable for agriculture as practised (1) by the European, and (2) by the native.

(E) Zones in which forests should be reserved for commercial or protective reasons. The classification and valuing of forest growth for stocking purposes.

(F) In certain parts of Africa the correlation existing between the tsetse-fly and climate, geology, soil, vegetation, fire, game, and man.

(G) The rapid selection of the most suitable alignment for railways and roads, where alternative routes are possible.

(H) Surveys connected with water-power schemes, catchment areas and irrigation.

(I) The photographing of coast lines, harbours, islands, and reef areas in order to assist in Hydrographic Surveying.

(J) The survey of rivers for the improvement of navigation.

(K) Making of maps for town planning and improvement purposes.

(L) For land valuation purposes and the collection of land revenue.

(M) The tracing of ancient towns, village sites, buildings, irrigation and agricultural systems.

From this list, which can be further extended, it will be seen that an air photo survey can find its uses in almost every branch of State activity and commercial or industrial enterprise. This is more especially the case in undeveloped and partially developed countries. Its chief field undoubtedly lies in new countries, although the quoted report from Michigan also show its usefulness in long-settled countries.

At a paper on "Aircraft in Relation to Petroleum Technology" read by the author before the Institution of Petroleum Technologists in February of this year, Mr. Robert Annan, the well-known geologist, testified to the value of air photographs of areas which had already been highly geologised on the ground. He quoted from a letter written to him by Dr. W. S. McCann dealing with the extension of the main reef in the Far West Rand. Here the reef was covered by a heavy layer of dolomite, but its direction had been traced by geophysical methods. A test was made by flying over the area and taking a series of overlapping vertical photographs. Dr. McCann stated that: "The results of this test were most satisfactory, and we are being furnished with much valuable information, not only concerning faults but the position of dykes along which chert has been developed in a manner hitherto unrealised."

2. SPEED AND COST.

Air photography enables survey work to be greatly speeded up as the following examples indicate: A Government Report shows that in Burma it was estimated that an air survey of the Irrawaddy Delta, which was carried out in five months, would have occupied three to four years by ground survey alone: and the air survey allowed complete topographical and forest maps, including type classification, to be available within a year, at a cost of Rs. 293.7 per square mile, whereas a ground survey taking three to four years, would only have provided a topographical map and would have cost in the neighbourhood of Rs. 500 per square mile, without giving any indication of the types of forest growth.

An air survey of an area of 65,000 square miles in Northern Rhodesia was recently completed in a total period of eighteen months at a cost of £1 per square mile including the laying down of the ground control and making the maps to a scale of 1/250,000: the photography taking three months and the full maps being drawn and handed over in another fifteen. By ground survey many years would have been required for the work, because it was mostly of difficult bush country.

A survey of Rio de Janeiro was required for the purposes of town planning and municipal development on scales varying from 1/1,000 to 1/20,000. This called for particularly close and detailed work, but by using air photography to help the ground surveyors the survey was completed within three and a half years, which competent experts estimate would have taken from ten to twelve years or more if executed by ground survey methods alone.

A Survey Department in South America is engaged in a regular programme of mapping the State, and estimates it will take up to sixty years to complete the survey. An air survey could accomplish the work in about three to four years, and would provide much fuller information of economic value than the ground survey can hope to do.

An air survey recently completed in the Sudan occupied only about eighteen months as compared with a period of ten years, which it is competently estimated would have been required to carry out a ground survey.

3. SCOPE OF INFORMATION.

(a) MAPPING.

It might be generally supposed that all the civilised countries in the world are more or less efficiently mapped, and that there are few which are not covered by half-inch-to-the-mile or larger scale maps. Actually four-fifths of the British Empire are not mapped even to such a small scale, and there are large areas which have not been reliably mapped at all. An outstanding instance of the latter is in Jamaica, which we have occupied for nearly 300 years, and of which no reliable map of real value exists to-day. One of the most urgent needs in any plan of Empire development, is the scientific mapping of enormous tracts of country, of which at present no maps exist which would be of the slightest value for development purposes. Such rough and sketchy maps as do exist, have to be supplemented with further detailed survey, before, for example, any line of road or railway can be considered and any scheme of water power, storage, or irrigation planned on sound lines.

In many instances our Colonies have had to construct railways without a properly contoured map of the whole country, with a consequent faulty alignment, resulting in a waste of effort in construction, and a continual cost of maintenance and haulage much higher than would have been necessary.

A distinguished Colonial governor, the late Sir Gordon Guggisberg, who was also an experienced surveyor, has given a striking illustration of such waste. When taking part in a discussion at a paper read by the author he stated that "one and a half million pounds had been spent in straightening out the railway between the coast and Coomassie (Gold Coast)" which had been constructed before the country was properly mapped. He continued—"if you can get a photographic map first, you are going to save yourself literally hundreds of thousands of pounds in road or railway construction; but if you are going to conduct that survey working through forests, you are going to take a very long time."

There are vast areas of our Empire which are capable of early and profitable development, but this is being kept in check by the lack of economic survey and scientific maps giving information as to the sources of development ready to be profitably opened and worked.

(b) FORESTRY.

Forestry was one of the first industrial fields in which air survey demonstrated its usefulness. In Canada, in 1922, a survey of about 14,000 square miles was carried out over the James Bay, Ontario

area for the Department of Lands and Forests, and proved extremely successful.

In this instance, maps of a sort were available, and the intention of the new survey was in part to check and correct these, and in particular to map the stock of trees of different types in the area, and select the sections best suited for development. The survey showed that one-third of the area in a southern section had three-fourths of the timber-bearing surfaces and with less unworkable parts; and that nearly eighty per cent. of the whole area was occupied by swamp, scrub, and burned-out timber, with the timbered parts scattered all over the area. The maps compiled from the photographs marked the location of six types of timber with the added comment on percentages of species, immaturity, and poor growth in the various districts.

This information was gained in under 350 flying hours, and enabled the department to concentrate on ground work on the most profitable districts and to eliminate any examination of eighty per cent. of the whole.

As already mentioned in the Irrawaddy Delta of Burma, a Forestry Survey was carried out by air photography, the topographical forest maps were made from the photographs in a year, and the areas and tree types over the whole 1,400 square miles accurately classified. The whole area is dead flat, and covered almost entirely with tropical forest, penetrable only with extreme difficulty because of dense growth and mangrove roots, soft deep mud, floods, and tides. The information obtained could only have been secured by ground survey at practically prohibitive cost.

Another good example of the value of air photography also comes from Canada—this time in the immediate and commercial use made of the survey. Working parties were ready to set out on the ground when it was decided to make a preliminary air reconnaissance first. The area was of over 4,000 square miles previously unexplored for timber conditions. The air reconnaissance was completed in three days, tracings being made in the field and handed over to the ground parties. The final tracing showed one block of 1,000 square miles burned out, and the party which was detailed for examination and sampling of the timber of this block was diverted to another which was commercially workable. It was possible to divert in similar fashion, the ground parties to blocks of merchantable timber and ignore the unmerchantable.

Another survey in Canada mapped the burned-out blocks, listed six species of tree and the percentage of hard and soft wood in blocks, and divided the types into commercial (with an average diameter of six inches and over) and uncommercial hardwood, softwood, and mixed. Information was also obtained regarding which streams could be used to float timber out, and the best directions to haul. A programme of exploitation was immediately drawn up, not only for immediate execution, but extending over a series of years.

These are only a few of the directions in which air survey has proved its economic value in forestry. It is to be specially noted that by the appearance of the foliage, shapes of the tree-tops, colour, and other indications, the various types of timber and their merchant-

able value can actually be distinguished on the photographs, and accurately mapped, in many countries.

(c) ECOLOGY.

Plant ecology is a science which is becoming more developed and more important every year. Vegetation covering the ground has, in many cases, close relationship to the soil in which it grows. In undeveloped or partially developed countries, where natural conditions are largely to be found, the air photographs provide valuable information by the appearance of the vegetation, because the photographs distinguish between the shades of colour, thin or dense growth, and the different types which grow on the various classes of soil.

The air photographs can give valuable indications of the zones where soil conditions are favourable to agriculture by Europeans or by natives, to the raising of produce suitable for export or local markets, zones where soil and conditions of vegetation are an indication of dangers to human or animal occupation because they are favourable to the breeding of such disease carriers as the malarial mosquito and tsetse fly.

In an air survey made for the special purpose of town development, we have a very convincing illustration of the practical application of this little-known science of ecology to everyday commercial use.

Air photographs were taken of wide suburban areas of about 100 square miles round principal towns in Northern Rhodesia to ascertain which lots might most advantageously be laid out in plots for building and which for agricultural use.

The photographs indicated where the soil was naturally supporting a flourishing vegetation which could easily be classified. With such knowledge the ground surveyors could expedite their work of parceling out the ground into building sites and the most promising plots for agricultural purposes.

(d) GEOLOGY.

The very expressions "air" and "geology" may seem a contradiction of terms and those without knowledge of the great advances made during the last year or two in the application of air photography and observation to geological surveys, may find it hard to believe that photographs taken from several thousand feet above the earth can give any indication of the geology and mineralisation of the ground below.

But in certain areas such air photographs have been proved, and admitted by experts and authorities, both to add greatly to geological knowledge and to give clear guidance to geologists and mining prospectors as to where their activities may be most quickly and profitably directed.

The air photographs make possible the rapid provision of a map, without which no geological survey can be made. A study of these photographs gives the expert much information as to the existence of previously unknown outcrops, and the extension of mineral-bearing formations which are already known.

By means of the photographs, valuable time and expense can be saved, because in certain areas they give quickly information as to

where mineral deposits are likely to be found, and, at the same time, provide a guide to the best means of access to the areas and useful data in connection with the working of them; while, alternatively, time and expense may be saved by excluding areas which are clearly indicated by the photographs as not being worth ground examination.

Mr. Robert Annan has stated that "it was surprising how much information could be gained from photographs in circumstances which might be thought unpromising. It was, however, necessary to guard against seeing in the photographs more than was actually there. Any deductions made from them must be verified on the ground, and it was a safe principle that the clues might be found in the air, but the evidence must be provided on the ground."

Testimony as to the value of air photography in relation to geology is given in a letter from the Director of Geological Survey in Canada to Mr. Donald Gill, from which the following quotations are taken:

"The photograph frequently shows faults and other geological structures more clearly than those structures could be recognised on the ground. This appears to be due to the fact that an observer has anywhere from two square miles up to ten square miles of country under his observation at one time in a photograph, whereas on the ground his observation is usually limited to a radius of a few hundred feet or yards."

The last paragraph of this letter is perhaps the most significant. It reads: "We have had a considerable number of cases in which geological structures are visible in photographs that could only be worked out by ground methods in a period of days, weeks, or even months; and, even then, not so satisfactorily."

The methods by which information is gathered from air photographs are too involved to permit of more than the briefest outline, but they are well summarised in an extract from the writings of Mr. Donald Gill. He says:

"In studying geology from the air we have to be on the lookout for the effect of the geology on features appearing in the photographs or visible from the aeroplane.

"Geology, as seen from the air, expresses itself through (1) topography, (2) soil colour, (3) vegetation, (4) rock outcrops, and, finally, (5) the impression created by cumulative observations of Nos. (1) to (4)."

The connection between (2) and (3) above and geology is in that science of ecology to which brief reference has been made. A simple illustration is to be found in observations carried out in England where, even in such highly-cultivated counties as Kent and Sussex, the outcrops of the Weald Clay and the Gault could be traced with reasonable accuracy simply by following the oaks which flourish on those clay soils; and in the South of France again, a fault bringing two geological structures into juxtaposition could be traced a long way by the box-shrubs that are on the limestone side, and the juniper-bushes flourishing on the other side in ancient rock formation.

Mr. R. Bourne, of the Oxford Forestry Institute, in writing of the conditions of the copper belt in Northern Rhodesia, has also recorded his belief in the use of air photographs for geology and summarises his conclusions as follows:

"It would appear reasonable to deduce that the distribution of vegetational types and sub-types considered in conjunction with the soil colour and the form of the drainage system indicates (a) changes in geological formation, (b) the stratification of certain formations, (c) the outcrop of certain strata, and (d) the general direction of strike in stratified rocks."

The whole of that information described in (a), (b), (c), and (d); and the knowledge of soil colour and form of drainage system, must obviously be of the greatest assistance to the geologists and the mining prospector, and can most speedily and easily be obtained with the assistance of air photography.

(e) ROADS AND RAILWAYS.

An example has already been quoted of an expenditure of one and a half million pounds to correct errors in the line of the Coomassie railway due to a want of complete maps. A well-known British railway company in South America was able recently both to avoid such waste and to select the line of a proposed new adhesion railway up a serra at a minimum expenditure of time and money.

The General Manager of the Railway wrote the company which carried out the air survey of the forest-clad mountainous country where it was intended to run the new line, and acknowledged that the survey had provided all the information required to allow of a decision that the alignment and construction of an adhesion line with a maximum two per cent. grade was possible in a distance of forty-one kilometres. He also stated that owing to the difficulty of the ground, it would have required the employment of several field parties to obtain the same information, that it would have taken a much longer time, and would have cost at least eight times as much as the air survey.

An air survey may not only show the most favourable alignment for roads and railways, but it may also show what areas are most suitable for development and where roads and railways are likely to tap districts with readily available resources.

(f) WATER POWER, STORAGE, ETC.

The air photographs can be made to yield useful information relating to the contours which is needed in a preliminary survey for the selection of sites for irrigation dams, and the general lines of direction for canals either for irrigation or transport. They also give valuable guidance in considering water power schemes, the possibilities of navigation and transport by lake and river, the planning of canal systems, and siting of locks and the many other uses of a country's water resources.

Lumber companies have been shown what streams were available in their natural state for the "driving" or rafting out of timber, as well as how, where, and at what approximate cost other streams could be made useful for the same purpose.

A Hydro-Electric Commission of Ontario has stated that an air survey had been of proved value in relation to a proposed power line.

The existing maps were found to be seriously erroneous, and if they had been relied upon for the location of the line, the results would have been disastrous, and, in fact, a line laid down on them

would have been interrupted by lakes which were as much as half a mile off their map position. The air photographs and "mosaics" allowed the commission's right-of-way agents to go out to secure options or easements for right of way without any preliminary field survey work; and the maps showed so clearly the distinction of thick and thin bush, large or small timber, that, on this information alone, clearing contracts were let out locally before field survey work was done.

The Bulletin of the Commission states that by the use of the photographs "expensive preliminary field surveys have been practically eliminated, and the work of line location much facilitated," that "it has been possible to lay down a much more direct and shorter route than would otherwise have been possible, and to use it with confidence as the best final line location," that "they (the photographs) provide a detailed, accurate, permanent, and easily accessible record of what is on the ground" and that "the information of the aerial photographs will be of the utmost value during the period of construction."

An air survey of Lough Neagh, Ireland, was made in connection with a power scheme, and here the advantages of speed were clearly demonstrated. The photographs of the Lough, eighty-five miles in perimeter, were taken in a single flight, showing the height of the water at a certain flood level, and the submerged land. From the detail common to the photographs and to the Ordnance Survey maps, the water level could be laid down before it had had time to vary. A field survey must have taken many days or weeks, during which the water level would have risen or fallen to a very appreciable extent.

A Boundary Commission endeavouring in 1927-28 to locate the watershed between the Zambesi and Congo basins called in the aid of air photography. From the ground the watershed is extremely difficult to define, because the area is flat and the ground largely swamp and covered with thick bush. But the air photographs showed clearly the trend of the watershed and the general direction of the drainage system.

An Air Survey was made of about 1,000 square miles on both banks of the Tigris above and below Bagdad for the formulation of an irrigation scheme; and even while the maps were being prepared from the photographs, knowledge of the area was sufficiently good to allow of plots being sold to prospective cultivators of the ground to be irrigated.

(g) HYDROGRAPHIC WORK.

The air photographs may be of the greatest assistance to the Hydrographer in providing information relating to coastal topography, suitable sites for sea loading stations, submarine pipe laying, bars at harbour mouths, dredging requirements, existence of currents, and general hydrographic data.

(n) ARCHAEOLOGY.

Thanks largely to Mr. O. G. S. Crawford, F.S.A., Archaeology Officer to the Ordnance Survey, air photography is now recognised as a valuable servant of archaeological exploration in Great Britain. Air photographs have laid bare the outlines of ancient fortifications, camp, and village sites, agricultural systems, irrigation and canal systems, and roadways.

In many cases ancient works have been discovered through the vegetation above them being of a different shade of colour to the surrounding vegetation. This is usually caused through the soil covering the remains having a different moisture content to that of the surrounding soil. Sometimes the change in the shade of colour of the vegetation is so slight as to be completely hidden to the observer on the ground, even though he may know that the change in shade is present, yet under such conditions, when examined on a vertical photograph, the shapes of complete streets of houses may stand out in perfect clearness. Ancient earthworks show up clearly on the photographs when the sun is low in the sky, owing to the effect of the long shadows. An air survey recently completed in Iraq not only showed the traces of ancient village sites, but also disclosed details of a comprehensive canal and irrigation system which had been practically hidden to the eye of the observer on the ground, owing to the accumulation of dust throughout the ages. Likewise in South America most interesting finds of interest to archaeologists have been made through the use of the air camera.

4. CO-ORDINATION OF INTERESTS.

It is believed that enough has been said to indicate the wide variety of interests which can be served profitably by air surveying.

Unfortunately it has happened too often that there has been no co-ordination of these interests, and that surveys have been carried out by one or other of them without regard to its application to others. There have even been instances of two or three separate surveys being made to serve their two or three separate objects, with a waste of effort and expenditure deplorable in itself and still more so in its effect of making a survey appear to be prohibitively expensive, and outside the limit of costs which would be within the range of consideration by a commercial concern.

A striking illustration of such expensive duplication and triplication of survey costs is to be found in a paper by Captain C. R. Robbins, M.C., published by the Cambridge University Press in the *Journal of Ecology* of February, 1931. An extract from the article refers to the surveying of a part of Lower Burma; and reads as follows :

“This area comprises some 16,000 square miles ; is largely covered with dense evergreen forest ; and has a small population, most of which is concentrated along the coast. After many years of inactivity, the area was mapped on a scale of one inch to one mile, but no attempt was made at that time to secure any geological or forest data, both important in an area heavily mineralised and mainly tree-clad. Soon afterwards the geological department sent out its surveyors and they prepared excellent maps showing the main geological formations but without indicating in any way the soil and agricultural possibilities of the hinterland. Finally, the forest service undertook a complete survey to prepare stock maps of the various forest types : these maps certainly achieved their main object of showing those areas worthy of permanent allotment as reserves and those containing poor stands.

“But all these un-co-ordinated efforts, while each produced excellent results in its own way, failed to correlate the geological,

soil, climatic, and other factors that gave rise to the existing state of things."

Here then is an instance of three separate surveys being made of the one region where one complete air survey would have served not only all three of these objects, but several others as well.

One of the main objects of the author in preparing this paper, is to indicate how such waste and overlapping may be overcome by the co-ordination of all possible connecting interests. This can only be done by all those government and private interests likely to benefit by air survey joining together in some common plans of development. Is this too much to hope for? The value of air photographs to almost every phase of economic development as already explained, should make an appeal to a large variety of interests. By the co-ordinating of these interests the cost of the air survey would be divided among them proportionately according to their participation.

There are many countries where it would be a feasible plan for the Government to undertake to provide part of the costs of an air survey, and to allow a number of commercial and industrial companies with varying interests to share the remainder of the cost, on the condition they each would be provided with maps and photographs giving information relative to their particular activities. Although it would probably pay any one of these interests to go to the whole expense of an air survey for their one particular purpose, it would be far more attractive if the inducement were offered of the cost being divided, even if only amongst two or three. There are to-day several opportunities for the initiation of, and contracting for air surveys which are only held up for the lack of a business-like and systematic plan for co-ordination of interests.

5. THE IMPERIAL ASPECT.

There was never greater need for extending operations than at the present moment, when throughout the whole Empire the trend is towards economic unity and exchange of Empire products; when migration has practically ceased because of lack of employment for their own people in the overseas Dominions; when development schemes have been curtailed or postponed because of lack of finance and of the uncertainty as to when and what extent remunerative results might be attained; and, finally, when nations outside the Empire are realising that their intensive efforts and full development are required if they are to hold such share as they now possess in Empire markets.

There is no doubt whatever that air survey could be of great value in connection with the opening up of the Empire and the development of its economic resources. While it is true that to-day we suffer from over-production of many commodities, yet there is no doubt that the country which has full knowledge of its economic resources is going to be in a far better position than the country without such knowledge. To-day much has already been done, for two British companies have alone been responsible for surveying some 200,000 square miles in different parts of the Empire. While some 640,000 square miles have been mapped by air survey methods in Canada by the Canadian Government and by private enterprise. Air survey

has now definitely proved its value as an instrument in Empire development and a great deal of experience is available from the extensive operations which have been carried out in different parts of the world by British enterprise, representing the expenditure of a considerable sum of money. It is to be hoped that it is not expecting too much of Government departments and private interests concerned with Empire and trade development to consider the various services that air surveying offers before completing their development plans.

NOTE.

The chairman of this session was COLONEL THE MASTER OF SEMPILL, who introduced Mr. H. Hemming as a pioneer of air survey. Mr. Hemming was about to undertake work on behalf of the Western Mining Corporation of Australia over an area which extended 12,000 miles between the northern and southern boundary, during which operations directional wireless would be used for the first time. Following the lecture, which was illustrated by lantern slides, Mr. Hemming answered many questions regarding air survey in Brazil, Canada, and South Africa. A discussion followed in which the desirability of some central organisation for the collection and preservation of aerial photographs, such as was already in existence in Canada, was emphasised. Contributors to the discussion were MR. B. M. HEADICAR, PROFESSOR R. S. HUTTON, MR. A. B. BLAKE, MR. G. P. INSH, MR. A. W. LING, and MR. A. E. DILLON. An account of this discussion can be seen by members on application to the offices of the Association.

Final Session.

At the Final Session of the Conference the chair was taken by Professor R. S. Hutton. The delegates passed votes of thanks to the Warden of Wills Hall and to the members of the University and City of Bristol for their hospitality and interest, and for their share in making the Conference a success. Special thanks were due to those Bristol members of the Association who had actively helped to rouse local interest in the meeting and had organised visits to the University and Central Libraries. Votes of thanks were also passed to the authors of papers, the chairmen and stewards of meetings, the Chief Steward and staff of Wills Hall, and to the staff of ASLIB.

The proceedings of the Conference then ended.

Report of the Eighth Annual General Meeting.

The Eighth Annual General Meeting (sixth since incorporation) of members and associate members was held at five p.m. on Sunday, September 24th, 1933.

Present : Forty-seven members and associate members were present.

Chairman : Professor R. S. Hutton (Chairman of the Council of the Association) acted as chairman of the meeting.

ITEM I. Minutes of Last Annual General Meeting.

The minutes of the Seventh Meeting, having been printed and circulated with the last Conference Report, MAJOR G. B. ATHOE moved that they should be taken as read. It was agreed that they should be confirmed and signed as correct by the Chairman.

ITEM II. Balance Sheet and Accounts, 1932-33.

A letter had been received from Sir Frederic Nathan regretting his absence through ill-health and asking Mr. Ridley to present the statement of accounts. MR. A. F. RIDLEY voiced the regret of all present at the absence of the Honorary Treasurer and presented the audited statement of accounts on his behalf. These had already been circulated, and on the motion of MR. A. F. RIDLEY, seconded by MR. B. C. CURLING, they were accepted.

ITEM III. Appointment of Auditors.

On the motion of MR. W. L. COOPER, seconded by DR. W. BONSER, it was resolved unanimously that Messrs. West and Drake be re-appointed auditors to the Association.

ITEM IV. Election of Council.

The CHAIRMAN announced that, according to the Articles of Association, one-third of the Council members should retire annually, but that where their places had not been filled up by fresh nominations the retiring members are eligible for re-election. Only one nomination had been received this year, that of Mr. R. Brightman.

The following had resigned their membership of the Council and did not wish to stand for re-election : Miss A. L. Lawrence, Mrs. J. E. Hodgson (Miss Norma Lewis), Dr. A. P. Thurston, Mr. P. R. L. Tingley, and Dr. J. C. Withers.

On the proposal of PROFESSOR R. S. HUTTON, seconded by MR. J. W. H. BROWN, the following election and re-elections as members of the Council were unanimously approved : R. Brightman, Mr. H. Vincent Garrett, Professor R. S. Hutton, Mr. L. Honeyburn, Mr. J. G. Pearce, and Mr. A. F. Ridley.

The full list of members of the Council will be found on page 4.

ITEM V. Election of President.

It was unanimously agreed that Sir Charles Sherrington should be re-elected as President of the Association.

ITEM VI. Election of Honorary Treasurer and Honorary Secretary.

On the motion of PROFESSOR R. S. HUTTON, seconded by DR. W. BONSER, it was unanimously agreed that Mr. A. F. Ridley should be elected as Honorary Treasurer and Mr. F. A. Hoare as Honorary Secretary.

ITEM VII. Reports of Kindred Organisations.

PROFESSOR R. S. HUTTON then read a letter of good wishes to ASLIB from Dr. Jürgens of the Notgemeinschaft der Deutschen Wissenschaft. Reports from kindred organisations of interest to members of ASLIB were read (see page 143).

ITEM VIII. Cost of German Scientific Periodicals.

DR. W. BONSER reported the successful representations made by ASLIB and other library and university organisations in supporting the memorandum of the University and Research Section of the Library Association, which should result in considerable economies to all libraries subscribing to German scientific periodicals. A full account will be found on page 141.

ITEM IX. Report of the Year's Work of ASLIB.

The CHAIRMAN then presented the Report on the Year's Work of the Association (see page 12).

This concluded the business of the meeting.

ASSOCIATION OF SPECIAL LIBRARIES AND INFORMATION BUREAUX.

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 30TH JUNE, 1933.

DR.	EXPENDITURE.			INCOME.			CR.
To	GENERAL EXPENDITURE—	£	s.	d.	£	s.	d.
Salaries	•	•	567	0	1		
Rent, Light, and Telephone	•	•	68	10	10		
Insurance	•	•	4	5	10		
Printing, Stationery, Postage, and Office Expenses	•	•	132	18	7		
Reference Books	•	•	1	8	6		
Travelling Expenses	•	•	18	0	1		
Subscriptions	•	•	17	0			
Press Cuttings	•	•	2	2	0		
Audit Fee	•	•	6	6	0		
Income Tax	•	•	1	2	6		
Depreciation of Furniture and Fittings	•	•	3	7	3		
„ Printing Professor Myres' Address	•	•	805	18	8		
„ COST OF 1932 CONFERENCE—			24	5	0		
Conference Expenses	•	•	238	2	2		
Printing Conference Report	•	•	113	8	0		
„ Expenses <i>re</i> Translators' Panel	•	•	351	10	2		
			6	13	10		
			£1188	7	8		
By GENERAL RECEIPTS—							
Membership Subscriptions	•	•	675	3	8		
Bank Interest	•	•	1	8	9		
„ Sales of Directory	•	•				676	12 5
						4	8 6
„ Donations towards cost of printing Professor Myres' Address	•	•	11	0	0		
„ Sales of Ditto	•	•	1	7	3		
„ CONFERENCE RECEIPTS—							
Fees and other Receipts	•	•	319	5	0		
Sale of Reports	•	•	11	6	0		
Advertisements in Report	•	•	17	0	6		
„ Receipts <i>re</i> Translators' Panel	•	•				347	11 6
						10	5 10
„ Balance, being excess of Expenditure over Income for the Year, carried to Balance Sheet						137	2 2
						£1188	7 8

BALANCE SHEET - 30TH JUNE, 1933.

DR.	LIABILITIES.	£	s.	d.	ASSETS.	£	s.	d.	CR.
To SUNDRY CREDITORS				4 8 0	By CASH AT BANK—Current Account		53	19 3	
" SUBSCRIPTIONS IN ADVANCE				14 14 0	" CASH IN HAND			10 2	
" WORKING CAPITAL—					" SUNDRY DEBTORS				54 9 5
As at 30th June, 1932		204	17	2	" FURNITURE AND FIXTURES—				2 1 10
Less Balance of Income and Expenditure					As at 30th June, 1932		33	13 0	
Account		137	2	2	Less Depreciation at 10 per cent. per annum		3	7 3	
				67 15 0					30 5 9
				<u>£86 17 0</u>					<u>£86 17 0</u>

We have audited the above Balance Sheet and have obtained all the information and explanations we have required. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the Association's affairs according to the best of our information and the explanations given to us and as shown by the books of the Association.

20th July, 1933.

8, New Court, Lincoln's Inn, London, W.C.2,
and at 16, Market Place, Reading.

(Signed) WEST AND DRAKE, Chartered Accountants.
(Signed) F. L. NATHAN, Hon. Treasurer.
(Signed) R. S. HUTTON, Chairman.

The Cost of German Scientific Periodicals.

Dr. Wilfrid Bonser, Librarian of Birmingham University, has submitted the following :

The high cost of German scientific periodicals, especially those published by certain firms, has resulted in a campaign to secure its reduction. The cost has been increasing for many years past, but matters have been brought to a head owing to the present economic crisis and the fall in value of the pound sterling.

It was felt both in this country and in America that unless a considerable reduction could immediately be effected, there would be no other alternative for most libraries than the cutting off of a great many subscriptions. Negotiations with the Börsenverein der deutschen Buchhändler have therefore been in progress with this end in view. It was felt that a large amount of the material published might be compressed with great advantage to the readers—a reduction of the cost naturally following. There have been many complaints also as to the means employed by the German publishers of swelling the size of journals of high reputation.*

A memorandum embodying these complaints was therefore drawn up by the University and Research Section of the Library Association, and sent to the Börsenverein on June 1st of this year. This memorandum was signed by the Vice-Chancellors of all our universities and by the Presidents of most of the scientific societies concerned, including ASLIB. Many members will already be acquainted with its contents, since it was printed in the June number of "ASLIB Information."

The following answer has now been received from the Börsenverein :

Offprint from the *Börsenblatt für den Deutschen Buchhandel*,
Nr. 190 for Aug. 17, 1933.

NOTICE.

RE AGREEMENT ON PERIODICAL QUESTION.

As a result of the complaints made by librarians at home and abroad upon certain difficulties relating to German learned periodicals, negotiations have been carried on between the Verband der deutschen Hochschulen and the Börsenverein der deutschen Buchhändler, which have resulted in the following agreement :

Münster, Aug. 3rd, 1933.

The Verband der deutschen Hochschulen and the Börsenverein der deutschen Buchhändler in consultation with a representative of the Verein deutscher Bibliothekare and a representative of the Arbeitsgemeinschaft wissenschaftlicher Verleger, with reference to difficulties arising in connection with learned (especially medical and scientific) periodicals, have come to an agreement on the following terms :

- (1) The maximum to which the size and price of a learned periodical may attain in any given year must be duly announced before the beginning of that year, and must be strictly adhered to, as only in this way can library budgets be accurately estimated.
- (2) It is expected that periodicals inflated in size and price, especially in the field of medicine and natural sciences, shall be cut down from 1934 onwards at least twenty per cent. in size and price as compared with the position in 1933.
- (3) The Börsenverein der deutschen Buchhändler considers the carrying out of these terms as of such importance for the prestige of German scientific authors, that it will regard their non-observance as an offence against the statutory duties of its members.
- (4) The Verband der deutschen Hochschulen expects of its members that they as editors of learned periodicals, shall support by all means in their power the measures to be taken by the publishers in accordance with Nos. 1 and 2 above, especially by rejecting dissertations which have no proper place in periodicals.

* I have discussed the complaints in detail in a paper published in *Nature* for July 1st, 1933, p. 34.

- (5) The Verband der deutschen Hochschulen and the Börsenverein der deutschen Buchhändler are agreed that by a more discriminating limitation of their scope and by the greatest possible concentration and clearness of expression, not only will the exterior size of German learned periodicals be considerably reduced, but their intrinsic value will be increased at least in the same proportion.

For the Verband der deutschen Hochschulen :

(Signed) PROF. DR. NAENDRUP (*Rektor of Münster*).

For the Börsenverein der deutschen Buchhändler :

(Signed) DR. F. OLDENBOURG.

For the Verein deutscher Bibliothekare :

(Signed) LEYH.

For the Arbeitsgemeinschaft wissenschaftlicher Verleger :

(Signed) DR. D. SIEBECK.

Executive Committee of the Börsenverein
der deutschen Buchhändler at Leipzig.

DR. F. OLDENBOURG, *President*.

Leipzig. Aug. 17th, 1933.

Most of the requests put forward in the memorandum are here agreed to. Unfortunately it has come too late to prevent many libraries from taking drastic action. One university library has already discontinued fifty-eight German periodicals, whose total annual cost amounts to about £220. It is most sincerely to be hoped that librarians and firms who were contemplating the cutting off of their subscriptions will now see their way to continuing them.

Reports.

Following the Annual General Meeting reports were received from the following organisations whose work is connected with and of special interest to members of ASLIB. Owing to lack of space these have had to be greatly shortened, but the full reports can be seen by members on application to the office of the Association.

THE NATIONAL CENTRAL LIBRARY.

Summary of a report by Colonel L. Newcombe. This brief report on the work of the National Central Library and the Joint Standing Committee on Library Co-operation during the past twelve months deals with those items which may be of special interest to members of ASLIB.

NEW BUILDING.—The Library is now occupying a portion of three floors of the new building which has been presented by the Carnegie Trustees. When the whole of the building is available, as it will be in a short time, it will be possible to organise the work on more efficient lines.

BOOKS SUPPLIED.—The actual number of volumes issued during the year has been only slightly higher than that of the previous year—that is, just over 50,000 volumes—but the value of the books issued has increased considerably. The great increase in library co-operation has enabled the Library to obtain on loan many important books and periodicals which a year or two ago would have been inaccessible outside the library possessing them. The books issued consist in the main of (a) those needed by the general reader, (b) highly-specialised or expensive books which the borrowing library would not be justified in buying, even if it could afford to do so, (c) scarce and out-of-print books, in some cases books of considerable age, rarity, and value, (d) foreign books, of which no copies are available in this country, (e) the back volumes of periodicals, and (f) photostat copies of manuscripts and rare printed books which cannot be lent. The number of university and special libraries taking advantage of the services of the Library has risen during the year from 133 to 164 and the number of foreign libraries from 13 to 29.

OUTLIER LIBRARIES.—There are now 130 Outlier Libraries associated with the National Central Library. Of these, 81 are university or special libraries, the remainder being public or county libraries which contain at least one special collection. It is of interest to note that whereas eight years ago only 362 volumes were obtained from 8 Outlier Libraries, last year 7,023 volumes were borrowed from 114 libraries. Actually, the increase in issues from the Outlier Libraries is a good deal higher than these figures indicate, as twelve of the libraries are co-operating in one or other of the regional library systems, and have lent in addition some 7,000 books to libraries in their respective areas.

REGIONAL LIBRARY SYSTEMS.—The organisation of a system of library co-operation throughout the country formed one of the most important recommendations of the Departmental Committee on Public Libraries in their Report of 1927, a recommendation which has now been adopted by a large number of the leading libraries in England and Wales.

There are now five fully-organised systems of library co-operation, the small one in Cornwall and the larger ones in the four Northern Counties, the five West Midland Counties, the whole of Wales and Monmouthshire, and the nine South-Eastern Counties. In these thirty-two counties 222 libraries of all types are co-operating.

Books are now lent through the National Central Library between libraries in one regional area and another. This is a development of the first importance, as, in effect, it means that all the libraries co-operating in the regional systems are providing a national service covering a large portion of England and the whole of Wales.

THE UNIVERSITY LIBRARIES.—From its inception the Library has lent books to members of universities, and since 1923 directly to many university libraries, but the year under review is the first during which this work has been fully organised. This is due in the main to the transfer to the Library of the Enquiry Office of the Joint Standing Committee on Library Co-operation. During the year 1,869

applications were received from forty-eight universities and 1,316 were successfully answered.

FOREIGN LIBRARIES.—The number of books lent to, and borrowed from, foreign libraries is rapidly increasing now that the possibility of obtaining books through the National Central Library is becoming more generally recognised. The books lent to and by foreign countries were all scarce books which could not have been obtained in any other way, since it is the practice of the National Central Library and similar institutions abroad to deal, as far as possible, only with one another.

UNION CATALOGUES.—Apart from the catalogue of the Outlier Libraries, which develops steadily but slowly, union cataloguing is making satisfactory progress. This is due almost entirely to the splendid work which is being done under the direction of the London Public Libraries Union Catalogue Committee and the Committees of the Regional Bureaux.

The number of volumes in the Outlier Libraries is 5,150,000, but these are only represented by some 70,000 entries in the union catalogue. These entries, small as their number is, are of great value and lead daily to the rapid location of books for which the Library is asked.

The union catalogue of the London Borough Libraries containing some 850,000 entries which is being compiled under the direction of the London Public Libraries Union Catalogue Committee, is in daily use by the staff of the National Central Library.

During the year the work of compiling the "Union List of Periodicals in the Universities Libraries" was completed. As was mentioned last year, this Union List is being published with the assistance of the Carnegie Trustees. All the material in the list has been placed at the disposal of the Editor of the "World List of Scientific Periodicals," who has in return made available a great deal of valuable information.

Considerable progress has been made with the union catalogue of the books in the regional library areas. Copies of the entries for the books in the Northern and West Midlands Systems are filed at the National Central Library, and those in the Cardiff Sub-Bureau will be duplicated and sent to the National Bureau at the National Library of Wales.

From this summary it will be seen that a national union catalogue of considerable importance is gradually being built up, the number of entries at the National Central Library being 1,200,000, and at the National Library of Wales 430,000, a total of 1,630,000.

THE FINANCIAL POSITION OF THE LIBRARY.—The progress outlined in this report is most encouraging. The Library is now well established, possessing a Royal Charter, a small Government grant, and an excellent freehold building in the heart of the university centre of London. All this would be splendid were it not for the fact that the Library is faced with the prospect of a stationary, if not a reduced, income just at the moment when everything else is in favour of its being in a position to meet the urgent and rapidly-increasing demands from libraries and research institutions of all types. An appeal for an endowment fund of £350,000 is being launched. The sum required is a large one, but the trustees are confident that the case they have to put forward is one which should appeal to many persons interested in higher education, general culture, and academic and industrial research. Contributions, however small—or, for that matter, however large—from members of ASLIB, an association which has always been so ready to help the work of the Library, would be especially welcome.

UNIVERSITY OF LONDON SCHOOL OF LIBRARIANSHIP.

Report by Dr. E. A. Baker on the Special Libraries Course. During the session 1932-33 there were only three students taking this course, as compared with four in 1931-32. Two passed for the Diploma, the third student is taking two sessions and will sit in June, 1934. There were a few ordinary students who took some of the special classes as an extra. Up to the present, two have entered for the special course in 1933-34, but there may be more entries yet. All who have passed have obtained appointments, except one who is in the latest list for a post at the present moment. In view of the general depression, the results are not too unsatisfactory. It would be useless to admit a larger number until there is a greater demand for people specially equipped.

THE WORLD LIST OF SCIENTIFIC PERIODICALS.

Mr. W. A. Smith sent a short report, from which it appears that about three-quarters of the new edition is now in print, and it is hoped that it will be published early next year. Members of ASLIB will be glad to know that though the published price of the World List will be three guineas, subscribers in advance of publication will be able to obtain it for two guineas.

COMMISSION INTERNATIONALE DE LA CLASSIFICATION DECIMALE.

Summary of a report by Mr. F. Donker Duyvis. This year the printing of the second edition of the Universal Decimal Classification has at last been accomplished.

Meanwhile the work of extension continues. With extensions, the decimal classification comprises to-day about 75,000 sub-divisions. The first series of extensions and corrections (about 7,000 items) has now been mimeographed and may be obtained from the secretariat. It is in loose-leaf form so that it may be kept up to date, intercalating new extensions as issued. Correspondents for special subjects have been approved. In Great Britain there are the following: Meteorology, Dr. Brooks, London; Biology and Agriculture, Dr. Hudson, Cambridge; Medical Sciences, Dr. Priestley, Oxford; Mechanical Engineering, Messrs. Lancaster-Jones and Spratt, London; Building Industry and Architecture, Mr. Roberts, London.

Lately special attention has been given to the extension of the classification of the social sciences.

The negotiations of the British Society for International Bibliography with our American colleagues on the subject of printing an English translation having come to a satisfactory conclusion, work on the preparation of a complete English edition of the U.D.C. is shortly to be begun.

The "Educational Foundation" (which publishes the American edition of the Decimal Classification) is quite favourably disposed towards this British edition. The latter will probably appear in parts.

A Spanish abridged edition was published in 1932.

A complete German translation is in course of preparation. A great part of the U.D.C. Manual has already been translated. A German translation of the part on "glass and ceramics" will appear shortly.

The office of the Commission of the Classification has moved to a new address: Octrooiiraad, Willem Witsenplein 6, The Hague. All British correspondence should be addressed to the British Society for International Bibliography, Science Library, South Kensington, London, S.W.7.

INSTITUT INTERNATIONAL DE DOCUMENTATION.

Note on the Report from Monsieur Paul Otlet. The Twelfth International Conference of Documentation held under the auspices of the Institut International de Documentation was held in Brussels at the Palais Mondial from the 18th to 20th July, 1933. It was attended by delegates from all parts of the world, including a representative of the Institut International de Co-operation Intellectuelle. ASLIB was represented by Dr. S. C. Bradford.

Although the I.I.D. studies the principles of documentation, and advocates co-ordination of work by standardisation of methods, it aims at being a centre of activity and free co-operation without demanding assent to particular theories. Consequently current ideas were well represented in the many papers read.

The importance, in which bibliographical questions are held at the present time is indicated by the fact that the Institut International de Co-operation Intellectuelle has recently undertaken an inquiry on cooperation between existing bibliographical organisations. This enquiry serves to show the progress of the work of the I.I.D.

THE NEDERLANDSCH INSTITUUT VOOR DOCUMENTATIE EN REGISTRATUUR.

Summary of a report by Mr. J. M. C. Muller. Partly owing to closer co-operation with the Nederlandsch Instituut voor Efficiency (Dutch Management Institute), the work of the Dutch Institute for Documentation and Registration during the past year has been characterised by a great activity, some aspects of which are referred to below.

Publications during the recent year :

- (1) REPERTORIUM TECHNICUM (International bi-monthly bibliography of books and of articles appearing in periodicals on technical and allied subjects), Volume II (will be closed shortly).
- (1A) DITTO, Appendix I, Parts 1 and 2 (Extensions and corrections of the Universal Decimal Classification as fixed by the International Committee on Decimal Classification in the period 1929-1932). (In French.)
- (2) SHORT COMMUNICATIONS OF THE DUTCH MANAGEMENT INSTITUTE (monthly), containing the Dutch Technical Bibliography. (In Dutch.)
- (3) ANNUAL REPORT for the year 1931. (In Dutch.)
- (4) J. M. C. MULLER. The classification of material from manufacturers' catalogues. (In Dutch.)

Information Service and Service for the Supplying of Publications.

Union List of Scientific Periodicals.—The compilation of a list of periodicals available in the Hague in public libraries was begun.

List of Documentary Sources.—The first edition of this list of sources of bibliographic data is now ready for issue in mimeographed form.

Committee on Copyright of Photographic Copies.—In consequence of a report delivered by Mr. P. Bourgeois at the Annual Conference of the Institut International de Documentation in 1932 at Frankfurt a/M, the Dutch Institute have appointed a committee to report on the Dutch standpoint in regard to copyright of photographic copies of articles.

Standardisation of Periodicals.—In consultation with the Head Committee for Standardisation in Holland, two standardisation schemes were published, viz.: (1) Rules for standard abbreviations of the names of periodicals; (2) standards for foot-titles on the cover of periodicals.

Management Research Group on Documentation.—With a view to arriving at a better distribution of the work, the Management Research Group on Documentation appointed three sub-committees, viz.: (1) Sub-Committee on "System and Execution"; (2) Sub-Committee on "Circulation of Documents"; (3) Sub-Committee on "Material for Documentation Purposes."

In the course of the year Mr. J. J. Roeloffs Valk, who was already functioning as Director of the Dutch Management Institute, was also appointed as Director of the Dutch Institute for Documentation.

NOTGEMEINSCHAFT DER DEUTSCHEN WISSENSCHAFT.

Summary of a report by Dr. A. Jürgens. This Association is pursuing its work on the old lines of systematically procuring foreign literature. The concentration of the most important foreign works to the State Libraries of Berlin and Munich has been continued.

Individual centres for the compilation of specialised literature have also been selected and supplied:

English Philology and Natural Science at the University Library of Göttingen.

Romanic Philology at the University Library of Bonn.

Ibero-American Literature at the University Library of Hamburg.

Nordic Literature at the University Library of Kiel.

Slavic Philology at the University Library of Breslau.

Literature of the Border-States and Philosophy at the University Library of Königsberg.

Oriental Studies and Italian Literature at the University Library of Leipzig.

Theology and Oriental Studies at the University Library of Tübingen.

Art and Archæology at the University Library of Heidelberg.

Periodicals of the descriptive Natural Sciences at the University Library of Frankfurt a/M.

For the purpose of securing delivery of the most important foreign periodicals to all University Libraries, the Association has lately created four Library Circles, each of which will receive as varied contributions as possible on the understanding that these periodicals are kept at the immediate disposal of every borrower within the circle.

The service of exchange with foreign countries has been expanded in so far that the Association has undertaken, at the request of foreign correspondents,

to send them monthly reports consisting of cards bearing indications as to the most important scientific books published in Germany in recent days. The Association receives in exchange either a remuneration of 20 RM. a year or duplicates from the libraries, etc. Included among these monthly lists of the best German scientific literature was a catalogue of the fundamental books on National Socialism. This list was also given in exchange, on their request, to a great number of libraries who do not partake in the whole of the series.

A particularly satisfactory new achievement is the compilation of a Library for the new *Landwirtschaftliche und Veterinärmedizinische Hochschule* (High School for Rural Economy and Veterinary Medicine), built on German principles in Ankara.

UNION FRANÇAISE DES ORGANISMES DE DOCUMENTATION.

Summary of a report by Monsieur Jean Gerard. The U.F.O.D. was established in May, 1932, with the object of inducing co-operation between those French bodies which produce and distribute documentary work, facilitating the systematic use of all documentary sources and establishing relations with foreign enterprises of the same character. Its work during the first year should be considered to some extent as preparatory.

REPERTORY.—The first task was to prepare an inventory of French centres producing and distributing documentation on all branches of human knowledge. A questionnaire was sent to all bodies concerned. This has met with a great response and consequently there is reason to hope that the inventory will be published in the near future.

TERMINOLOGY.—Before attacking the problems connected with the organisation of documentation, the U.F.O.D. considers it absolutely essential to establish the first principles of a vocabulary of this new technique which as yet does not possess a terminology. A Commission appointed with this purpose has examined all propositions submitted by members and has prepared a clear and simple French vocabulary. This is confined for the moment to a limited number of essential terms which are based as far as possible on established custom. This vocabulary might serve in the future as the foundation of an international dictionary, by stimulating the creation of similar vocabularies in other languages.

PHOTOGRAPHIC REPRODUCTION OF DOCUMENTS.—A conference of various interests concerned has considered the legal questions of photographic reproduction. The meeting was of the opinion that photographic reproduction by libraries and centres of documentation is legal in so far as the copies are intended for the personal use of the applicant. The meeting, however, impressed upon the libraries and centres of documentation the necessity of reminding their readers of the fact that rights of authorship applying to a document also apply to its reproduction.

INTERNATIONAL ORGANISATION OF UNIVERSAL DOCUMENTATION.—This is a question of the greatest importance upon which the U.F.O.D. has been invited to express its views to the *Institut International de Co-operation Intellectuelle*. Having examined the problem, the U.F.O.D. reported that the formation in every country of a national body uniting the existing centres should be fostered with a view to subsequent international co-operation.

SCHOOL FOR SPECIALISTS IN DOCUMENTATION.—The organisation and application of a new technique implies at all stages the existence of well-informed specialists. The U.F.O.D. has thought it necessary to encourage the creation of an institution where specialists on documentation could obtain theoretical tuition to fit them for posts as directors of general or special libraries or as assistants.

CIRCULATION OF DOCUMENTS BETWEEN THE MEMBERS OF U.F.O.D.—The *Administrateur-General* of the "*Bibliothèque Nationale*" has decided to offer to centres of documentation likely to be interested, on certain conditions, the official series published by the Government of the United States of America and presented to France.

CONCLUSION.—The tasks taken in hand by the U.F.O.D. during its first year of existence seem to open new horizons and widen the field of activity, large as that already was, which it had designed for itself from the beginning. The interest with which its activities have been met on every side make it possible to believe that it will become, in a short time, the truly representative organ of all French documentation, and that it will in this capacity contribute actively to the organisation of international documentation.

VERMITTLUNGSSTELLE FÜR DEN TECHNISCH- WISSENSCHAFTLICHEN QUELLENNACHWEIS.

Summary of a report by Dr. G. Freitag. During the interval between January 1st, 1932, and September 1st, 1933, 176 enquiries covering various fields of engineering were received by the Vermittlungsstelle für den Technisch-Wissenschaftlichen Quellennachweis (Clearing House for Sources of Information on Scientific and Engineering Literature) established by the Deutscher Verband Technisch-Wissenschaftlicher Vereine (Association of German Engineering and Scientific Society).

It has been found that compared with previous years the foreign countries show increased interest in the work of the Clearing House. Of 176 enquiries received, fifty-three came from abroad, the percentage of foreign enquiries so far handled being twenty-four per cent. The publication of a "Survey" containing addresses of the co-operating organisations and indicating their scope has in advance answered many potential enquiries.

The further enlargement of the Clearing House by establishing an extensive index system, etc., had again to be postponed in view of the unfavourable economic situation.

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NOTE.—*This is not a complete subject index to the contents of the papers, but only to the names of speakers and the titles of papers, etc.*

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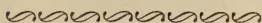
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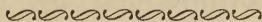
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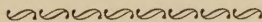
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